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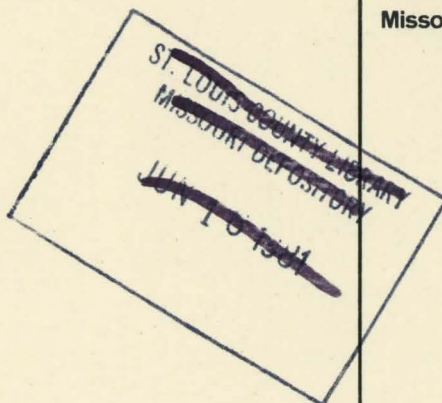
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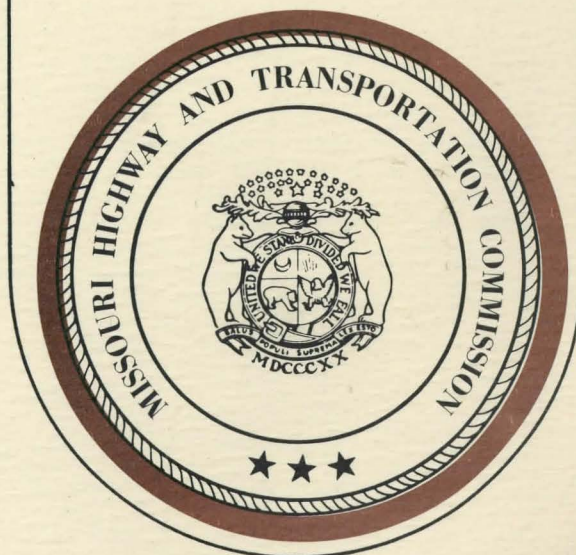
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# update 1980

Missouri Highway & Transportation Commission



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Missouri Highway & Transportation Commission

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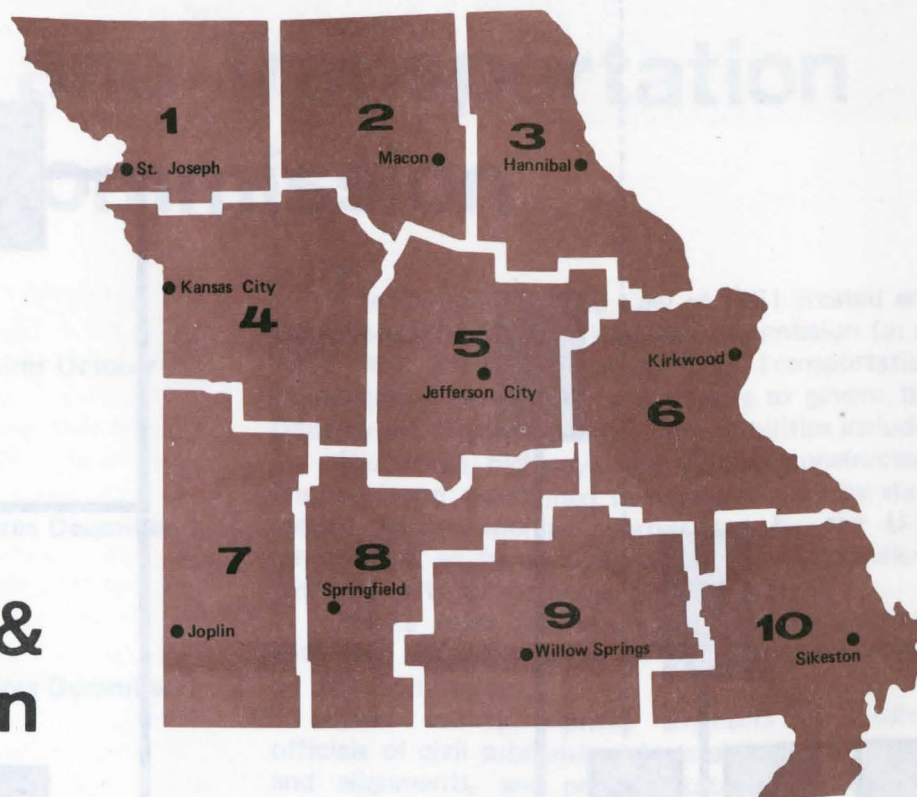
Required by statute, this annual report highlights the accomplishments of the year, the status of the system as of the end of 1980 and the goals for the future for the Governor and Legislature of Missouri. But more than that, it is a guide into the inner workings of the Department for any citizen who wishes to know where, when and how his tax dollars are used. In the financially troubled year of declining revenues such as the Department has faced and will continue to confront in 1981, an informed and interested public has been vital to the continued development and operation of Missouri's highway program. Accordingly, copies of this report are available to the news media. So far as the number of published copies permit, they are also available to interested public officials and private citizens. It is the Department's sincere hope that the report will increase the general understanding of Missouri's highway administration. Any inquiries are welcome.

Prepared by: Public Information Division

Photos by: Surveys and Plans Division, Photogrammetry Section



## Organization & Administration



After 66 years of building and maintaining highways for motoring Missourians, 1980 proved to be a year of organizational change as taxpayers voted the Department additional responsibilities and additional revenue. In a special election November 6, 1979, voters merged the Department of Transportation with the Highway Department, creating the Missouri Highway and Transportation Department. Furthermore, the measure provided additional highway and transportation revenues through reallocation of one-half of the motor vehicle sales tax revenue.

As of January 1, 1980, the newly-merged Department and its governing body, the Commission, became responsible for providing and developing safe and efficient transportation systems with the funds available to it. This meant cooperating and coordinating with owners and operators of the various modal systems in the development and improvement of airports, rail facilities, ports and with operational costs of transit systems, as air, rail, waterways and transit became the additional modes of Department responsibility.

As these modes were meshed with highways, they were established as a unit within the Department reporting to an Assistant Transportation Director. He, in turn, reported to the Assistant Chief Engineer.

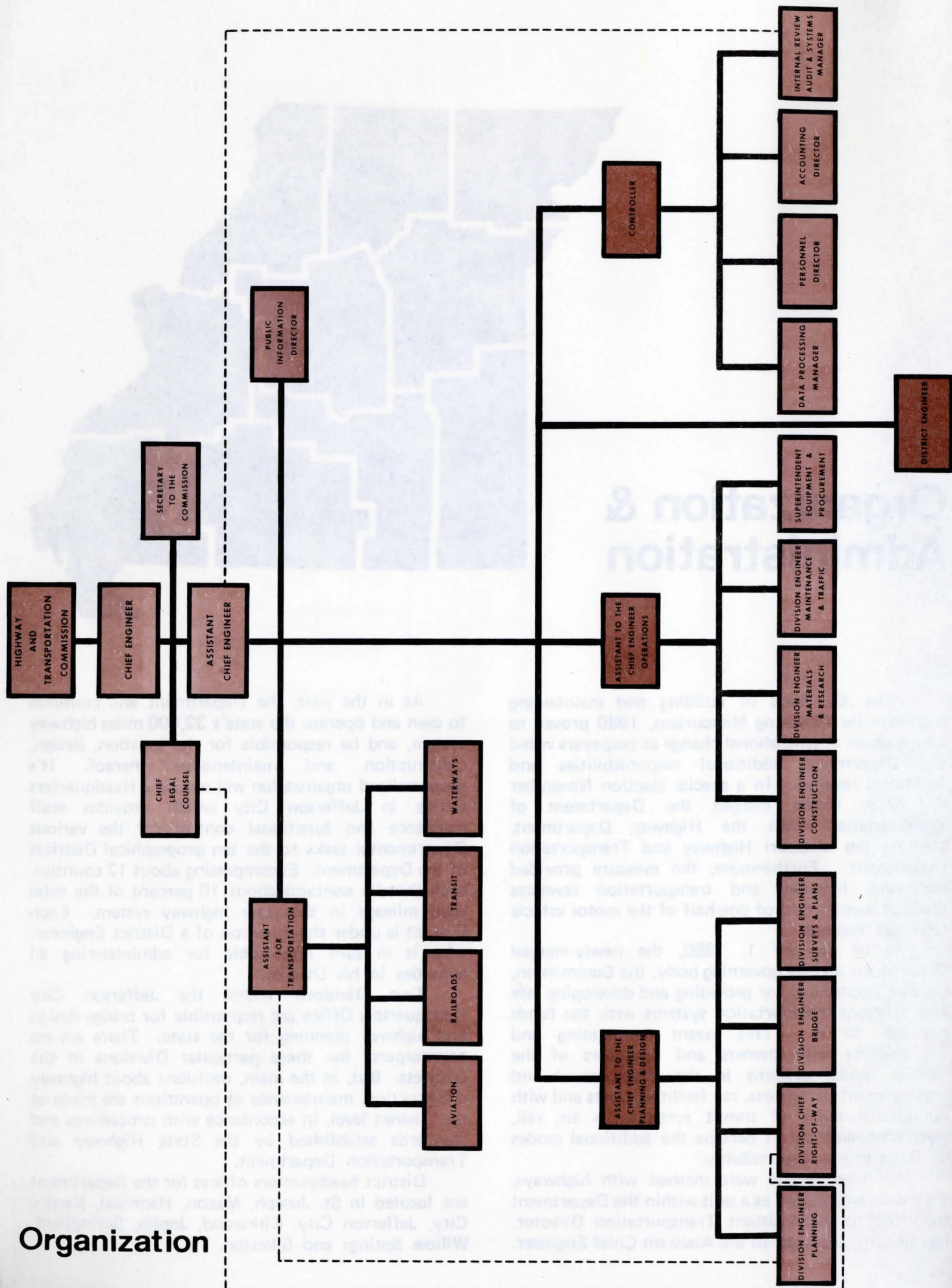
As in the past, the Department will continue to own and operate the state's 32,000 miles highway system, and be responsible for the location, design, construction and maintenance thereof. It's decentralized organization will remain a Headquarters Office in Jefferson City which provides staff assistance and functional control for the various Departmental tasks to the ten geographical Districts of the Department. Encompassing about 12 counties, each District contains about 10 percent of the total road mileage in the state highway system. Each District is under the direction of a District Engineer, who is in turn responsible for administering all activities in his District.

Two Divisions within the Jefferson City Headquarters Office are responsible for bridge design and highway planning for the state. There are no counterparts for these particular Divisions in the Districts. But, in the main, decisions about highway construction, maintenance or operations are made at the District level, in accordance with procedures and standards established by the State Highway and Transportation Department.

District headquarters offices for the Department are located in St. Joseph, Macon, Hannibal, Kansas City, Jefferson City, Kirkwood, Joplin, Springfield, Willow Springs and Sikeston.



# Organization





# The Missouri Highway and Transportation Commission

**JAY B. DILLINGHAM, Chairman**

Democrat from Kansas City

54th Commissioner whose term expires October 13, 1983

**ROY W. JORDAN, Vice-Chairman**

Republican from Clayton

53rd Commissioner whose term expires December 1, 1981

**ALBERT C. RILEY**

Democrat from New Madrid

45th Commissioner whose term expires December 1, 1983

**ROY B. GOODHART**

Republican from Hannibal

55th Commissioner whose term expires October 13, 1983

**EUGENE J. FELDHAUSEN**

Republican from Platte City

57th Commissioner whose term expires December 1, 1985

**CARL E. YATES**

Democrat from Springfield

56th Commissioner whose term expires December 1, 1985



Chairman Dillingham studies a recommendation for a highway improvement at one of the monthly Commission meetings.

The Centennial Road Law of 1921 created and empowered the Missouri Highway Commission (as of 1980, the Missouri Highway and Transportation Commission) with duties and powers to govern the Department. Primarily, those responsibilities include:

- \*Supervise highways and bridges constructed, improved and maintained in whole or part by state money aid or monies appropriated by the U.S. government, so far as such supervision is consistent with the acts of Congress relating thereto.

- \*Make rules and regulations not inconsistent with law, assigning duties of all persons employed by the Commission.

- \*Aid county highway engineers or other officials of civil subdivisions in establishing gradients and alignments, and prepare suitable systems for maintenance of highways and bridges.

- \*Cause standard plans, specifications and estimates to be prepared for the repair and improvement of highways and the construction and repair of bridges by civil subdivisions.

- \*Investigate and determine the best methods of construction and maintenance of highways and bridges.

- \*Aid at all times in promoting highway improvement throughout the state.

- \*Let all contracts for the construction or improvement of state highways.

- \*Prescribe a system of auditing and accounting for all road and bridge monies for the use of all highway officials.

- \*Construct, under its own direction and supervision, all roads, culverts or bridges.

- \*Compile statistics relating to public highways throughout the state.

Since the Department's merger with the Department of Transportation, the Commission has assumed the responsibilities of the former Transportation Commission. Those duties call for the development of transportation policy for the state, and primarily the consideration of applications for city or county port authorities, as well as the appointment of bridge commissions.

Today, as it was established in the past, the Commission is bi-partisan in nature and appoints the Chief Engineer, Legal Counsel and Commission Secretary to assist and carry out their policies.



# Funding Needs and

1980 began on a high and ended on a low as far as the Department's financial future was concerned. In January, Department officials were encouraged by the recent voter-approved Constitutional Amendment which would distribute one-half of the motor vehicle sales tax to the city, county and state highway departments beginning that month. This measure was expected to deliver an additional 18 to 20 million dollars for suffering highway programs and offset a 42 percent construction cost rise in 1979.

Unfortunately, it didn't work out that way. Inflation and lower-than-anticipated sales tax revenue nullified the effects this money had. Missourians were re-evaluating their needs in light of the escalating 1980 inflation and decided to drive the family vehicle another year before trading—hence reduced vehicle sales tax for the Department.

And those who did trade autos more often than not preferred a compact vehicle that would stretch their gasoline mileage, as well as their pocketbook. That, in itself, led to another revenue reduction problem.

One of the Department's largest sources of revenue comes from Missouri's 7-cent-per-gallon motor fuel tax. One of the lowest in the nation, the tax provided the Department \$158,320,671.22 for 1980. However, that amount for 1979 was \$176,429,098.52. The drop, one of few in the Department's history, proved motorists were using less gasoline.

The purchase of compact cars meant another revenue reduction during 1980. The Department receives fees from motor vehicle licensing. It's share of this dwindled, however, as fuel-efficient cars featured smaller horsepower engines and therefore paid less tax (vehicle license fees are based on car horsepower ratings).

Another inflation factor that affected highway and transportation income was the rising amount of money going to other agencies such as the Highway Patrol and the Department of Revenue. These agencies provided traffic enforcement and tax collection services. As the budgets of these agencies went up, the percentage taken out of the state

highway funds increased. And that meant less money available for work on state highway systems.

To further illustrate this point, the funds going to other state agencies in the last 10 years increased 189 percent, while the revenue from the fuel tax and license fees increased only 76 percent.

And this was not all that put the Department in a financial bind. Past highway and transportation programs were a mixture of both state and federal funds, with some programs undertaken with federal match money and others strictly state funds. However, in 1980, the Department was not able to undertake virtually any solely state-funded highway projects.

Whatsmore, if the situation does not change, projections indicate that by the end of this year, the Department will not even be able to match all federal money available to it. If the situation gets worse, that time could come sooner.

Lastly, the rules, regulations and procedural requirements the Department must adhere to when using federal funds on projects added much time to the project length. The additional time because of inflation, adds more to the final cost of a project.

The dismal picture just painted only looked more bleak as the months passed. This certainly was not the time for a poor financial outlook. Not when the needs of the system were and continue to be so great. One of the most obvious needs is the repair and replacement of old, deteriorating sections of highways and bridges. In some instances, bridges and sections of highway were and continue to carry traffic loads far in excess of what they were originally designed for. Intersections meant to handle 1,000 cars per day now carry more than 15,000 per day.

By the same token, more than half of the 6,800 span type bridges in the state highway system are either structurally deficient or functionally obsolete. That means they have problems in the bridge deck or structure, or by design limits, they are not able to handle modern traffic loads.

The need for increased highway maintenance came as a surprise to no one as worn and aged driving surfaces were rough on motorists and their vehicles. There were potholes, surface cracks, winding and



# Future Projections

curving roads and highway congestion to alleviate—but not enough money to do it all.

Missouri was the first state to begin construction of the Interstate highway system more than 24 years ago. Within the next 10 years, large portions of this 1,124 mile system will have to be resurfaced.

**F**urthermore, travel in Missouri is expected to increase in the coming years. By 1990, Interstate travel in Missouri is projected to be 61 percent greater than the highways were originally designed for. This much growth underscores the fact that the increased maintenance need will remain paramount, as time and increased travel can only worsen the highway conditions.

The highway system is not the only transportation system which needs help. Fuel shortages and rising costs have increased the demand for other transportation modes. However, long-range financial needs are still being determined. It is assumed Missouri will experience growth patterns similar to those projected nationwide.

Air travel could grow by as much as 77 percent. But few airports will be built because of high costs and land acquisition problems.

Rail traffic, both passenger and freight is expected to increase approximately 50 percent by the year 2000. While rail freight costs are borne by shippers and railroad companies, the cost of passenger service is a public one paid through Amtrak, the government-owned passenger line. The Department partially subsidizes two Kansas City-St. Louis passenger trains.

Growth of mass transit and bus systems could increase by as much as 26 percent in the future, but this depends on the amount of governmental funds available for use in these systems.

Use of the inland waterway system, including the Missouri and Mississippi Rivers, is expected to increase by as much as 70 percent by the year 2000. More lock and dam repair will have to be undertaken if pressure on systems is to be relieved.

So, as 1980 drew to a close, it was evident to Department officials and observers that something had to be done if Missouri's transportation systems were to stay in operation at their present level.

Action must be taken to increase the funding of the state's highway and transportation system.

And it was also apparent there were no overnight solutions, or any one method which would be totally effective. Many suggestions were made, but nothing was decided. Among those suggested were:

- \*the allocation of the remaining half of the motor vehicle sales tax to the Department

- \*a flat fee charged for passenger car and license fees instead of the variable fees now charged on the basis of horsepower ratings. This would end revenue loss under the present method as motorists turn to more fuel-efficient cars

- \*increasing operators driving license fees from \$3 to \$5 and chauffeur's license fees from \$10 to \$15 for a three-year period

- \*increase vehicle title fee from \$1 to \$5

- \*increase trailer registration fees from \$7.50 to \$15 a year

- \*limit Highway Patrol financing to \$30 million yearly for highway related uses; the Patrol has always received its funds from the Department

- \*replace the 7-cent-per-gallon motor fuel tax to a fixed percentage income from each gallon of gas sold; the tax could fluctuate as did gas prices, not saddling the Department to declining revenues

- \*add a three percent sales tax on automobile parts and accessories earmarked for roads; this would not be an additional tax since the three percent sales tax revenue currently goes to General Revenue

- \*instate a three percent sales tax to motor fuel and earmark it for roads; the present state law exempts motor fuel from sales tax

- \*increase the motor fuel tax from 7-cents-per-gallon to 10-cents-per-gallon

- \*issue revenue bonds; the cost would depend on the amount of bonds, prevailing interest rates and length of pay-back period.

**A**s stated earlier, these methods of additional revenue are only suggestions. 1980 ended with questions on the minds of Department officials. How would the financial future turn out? Hopefully, 1981 will provide some favorable answers.



## programs & progress

### COMMUTER LOTS GAIN POPULARITY

Missouri's statewide commuter parking lots proved to be pretty popular gathering places during 1980. Lot usage continued to rise while new lots were built to meet the growing demand of energy-conscious carpoolers.

Quarterly reports indicate usage rises for three quarters of 1980, while only one quarter fell in use. Usage fluctuations were determined by comparing the present quarter's usage with that of the previous quarter's. This provides the most accurate reflection as the lots are continually expanded and new ones built.

Specifically, the first quarter rose nine percent during January, February and March, with an average of 85 percent of the available spaces being used. That percentage represents 1,907 spaces actually used.

However, the second quarter--April, May and June--posted the only drop in number of autos that parked in the lots. Usage fell one percent as an average of 76 percent of the 2,497 available spaces were used. These spaces reflect a 252 additional space addition over the first quarter.

An increase of five percent showed up for the third quarter's usage during July, August and September. An average of 80 percent of the 2,497 spaces were used. During the preceeding three months, 1,888 spaces were actually used.

Finally, the fourth quarter indicated a three percent rise in usage during October, November and December. An average of 65 percent of the 3,174 parking spaces were being used. During the preceeding three months 1,989 spaces were used.

While commuter lot usage was closely watched and tabulated, Department employees were busy constructing eight new lots. Studies deemed this construction necessary and brought the total number of lots to 53.





The new lots, as all others previously, were constructed by Department personnel on Departmental right-of-way. They are located predominately near metropolitan areas. They offer centrally located parking clear of roadway and shoulders. Most feature a gravel surface, concrete parking blocks and fencing.

In addition to the lot

construction, many previously existing lots were expanded and updated to provide more spaces. This expansion, and construction takes place when needed and as the necessary right-of-way becomes available.

Specifically, the new lots constructed during 1980 were located at:

LOCATION	NUMBER SPACES
Interstate 70 and Woods Chapel in Jackson County	55
Route 50 and Chipman Road in Jackson County	87
Interstate 70 and Route 13 in Lafayette County	50
Route 29 at H in Platte County	40
Routes 54 and 17 in Cole County	35
Interstate 44 at Route 100 in Franklin County	35
Routes 67 and JJ in St. Francois County	36
Routes 71 and D in Bates County	28

## SECOND AMTRAK LINE ON THE TRACK

The "Ann Rutledge" 403(b) Amtrak passenger service train is sharing the track these days with a new counterpart. A second state passenger train running between St. Louis and Kansas City, the "Missouri Mule", made its inaugural run on October 26, 1980.

Like the year-old "Ann Rutledge" run, the "Missouri Mule" provides cross-Missouri service between the two metropolitan cities with stops at Jefferson City, Sedalia

and Warrensburg with additional stops planned for Washington and Lee's Summit and is partially funded by the state.

"Missouri Mule" service made it possible for St. Louisans to make same-day round trips. This along with steadily increasing ridership on the "Ann Rutledge" (attributed to rising gasoline costs and low ticket prices) prompted the Missouri General Assembly to subsidize the second train.



## HIGHWAY TRAVEL DECLINES

1980 proved to be a year of reductions for more than the Department. Missouri's motorists were reducing too--and it showed up primarily in their use of Missouri's highways. In 1980, travel declined 931 million miles (3.7 percent) over 1979.

Motorists logged 24.3 billion miles in 1980, while that figure was 25.2 billion for 1979. Only January and December 1980 showed any increases over the same months in 1979. Accordingly, motor fuel sales were 6.25 percent lower in 1980 than in 1979.

"We used to see fairly equal rises and declines in motor fuel use and travel," Chief Engineer Robert N. Hunter said, "but with the price of fuel rising and people buying more fuel efficient cars, the fuel use drop is becoming much sharper."

He added that the reason for the travel decline can probably be attributed to successful conservation efforts by Missouri drivers as well as the higher cost of operating an automobile and the extremely hot weather in the summer.

Travel dropped off 518 million miles on the supplementary highway system followed by a 274 million mile decline on the primary system and a 139 million mile decline on the Interstate system.

The highest travel month in 1980 was August at 2.3 billion miles while January was the lowest at 1.7 billion miles.

## HIGHWAY 63 PROJECT COMPLETED

With an October backdrop of bright red, yellow and orange trees across the hillsides, a ribbon was cut--marking the official opening of the final dual-lane section of U. S. Route 63 between Columbia and Jefferson City. Approximately 50 people--including officials from the Columbia and Jefferson City Chambers of Commerce who sponsored the ceremony, other city

cont.





Chief Engineer Robert N. Hunter cuts the ribbon marking the opening of a complete dual-laned Highway 63 between Columbia and Jefferson City as officials and dignitaries join the ceremony.

officials, area legislators, Main Office and District 5 representatives and additional guests-attended the event on Wednesday, October 29, 1980, at 2 p.m. at the Mount Pleasant crossover south of Ashland.

Before cutting the ribbon, Chief Engineer Robert N. Hunter dedicated the final segment of the highway to the continued safe travel of the motorist of Missouri. Opening the 3.7-mile section completes the four-laning of the 28.1-mile highway between the two cities. Dual-laning of the highway was undertaken with the award of the first contract for such work in 1961. Construction costs for dual-laning the entire 28.1-mile highway segment between Columbia and Jefferson City represents a \$42,219,372 investment.

Construction on this final portion of the project began in March 1978 when the grading contract was let. The paving contract was awarded in March of this year. The Reno Construction Company, Sedalia, was the prime contractor for the paving.

## TOURISM CENTERS SCHEDULED FOR HANNIBAL AND ROCK PORT

Two new Tourism Centers were in the works during 1980. A \$365,977.80 contract was awarded June 6 to Crane and Stolte General Contractors, Inc. of Hannibal for the construction of a tourist information center in Hannibal.

The new facility will be located approximately two miles south of U. S. Route 36. The work will include grading, installation of culverts, construction of the information center, placement of pavement of variable widths, installation of fencing and lighting and the placement of a memorial monument. Completion date for the project is planned for April 1, 1981.

While the Hannibal tourist information center contract was awarded during 1980, ground breaking ceremonies were held July 9 for another soon-to-be information center near Rock Port. At 2 p.m. that day, area legislators, local government officials and Tourism and

Highway Department officials assembled for the ceremonies of the new center.

The center will be located on the west side of Interstate 29, approximately one-half mile south of its junction with Highway 136.

The center will be part of a new highway rest area being developed at a total cost of more than one million dollars. Both center and rest area are expected to open in April 1981. It will remain open year-round to serve motorists entering from the north, giving them access to numerous brochures, maps and information concerning all parts of the state. An estimated 75,000 travelers per year will be served by the center and rest area.



## AMTRAK RIDERSHIP INCREASES

Ridership on Amtrak's St. Louis-Kansas City passenger train "Ann Rutledge" exceeded expectations for the first full year's operation under partial state funding and prospects for the future look even better. The state took over partial funding in October 1979.

Yearly figures show ridership on the train was 75,704, for a monthly average of 6,309. Initial estimates predicted a monthly average of only 4,500 or 54,000 for the year.

During the preceeding 12 months, the highest ridership was in August with 11,066. February was the lowest month with 3,431.

"The high yearly ridership is probably due to the rebirth of an interest in trains, reaction to high energy costs and because the St. Louis-Kansas City route has proved itself," Chief Engineer Robert Hunter says. "People are taking the train and spreading interest in it by word of mouth."

Individual monthly ridership figures for the last 12 months were 3,933; 5,433 and 6,129 for October, November and December 1979; 3,466 for January; 3,431 for February; 5,966 for March; 7,938 for April; 7,424 for May; 7,253 for June; 8,924 for July; 11,066 for August; and 4,741 for September.

## FINAL THIRD STREET PROJECT COMPLETED

The fourth and final project completing construction on the Third Street (I-44) area in St. Louis was a welcoming relief to motorists who travel the roadway day in and day out. This final project was let in June 1978 to J. S. Alberici Construction Company, Inc. at a cost of \$15,114,951.45. This contract provided for completion of the southbound bridge, removal and redecking of the existing bridge and roadwork at each end from 12th Street to the Poplar Street Bridge, a distance of 1.1 miles. The traffic lanes were put in final position in October and the final completion of

the project itself was in November.

The Third Street Viaduct was constructed in the early 1950s from Park Avenue to Gratiot Street in downtown St. Louis. This 3,224-foot bridge carried three lanes northbound and three lanes southbound of Routes I-44 and I-55. The existing bridge became inadequate for the volume of traffic and required continual maintenance of the deck. It was decided to construct a new bridge parallel to the existing one. The new bridge would carry four lanes of southbound traffic and the deck of the old bridge would be removed and replaced to provide four lanes for northbound traffic.

The first contract was let in June 1975 to J. S. Alberici Construction Company, Inc. at a cost of \$1,296,639.60 and was completed in June 1976. The second project, completed in June 1977, was let in April 1976 to Millstone Construction, Inc. at a cost of \$818,780.25. The third project was let in March 1977 also to Millstone at a cost of \$5,982,413.30 and was completed in October 1978.



A rebirth in train interest spurred by high automobile travel costs has most probably caused the marked increased ridership for Missouri's Amtrak line.



# operations

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As it became more apparent in 1980 that highway and transportation revenue-makers could no longer keep pace with soaring inflation rates, it also became more apparent that taxpayers were more interested in where their tax dollars were going within the Department. Feeling a responsibility to explain its role in the Missouri highway system, as well as show how funds are used and why they are necessary to provide the type of highway system Missourians have come to expect, the Department began a series of informative news releases to state media. The releases highlighted top operations within the Department and are presented on the following pages as they originally ran.

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## HIGHWAY FUNDING: HOW OUR REVENUE IS GENERATED

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The human circulatory system and the highway funding process are alike in many ways, the foremost being that without blood the body will wither and die, and without funding a highway system will fall into disrepair. It, too, will die.

As the veins and arteries carry blood to and from the heart, a variety of funding avenues carry money to and from the Missouri Highway and Transportation Department, the "heart" that is responsible for constructing and maintaining the nation's seventh largest state highway system.

Traditionally, the funding philosophy of Missourians and the Department has been that operating revenues should be user-generated. Stated another way, those who use the system should pay for its upkeep. To this end, those who use the highway system a lot pay more for its use than those who seldom use it.

In Missouri, nearly half of the total state highway revenue comes from the 7-cent-per-gallon tax on motor fuel. Missouri's cities and counties also share in the motor fuel tax revenue, with the state receiving 75 percent, the cities 15 percent and the counties 10 percent.

Another large state source of highway revenue comes from licensing motor vehicles, the yearly process through which license plates and renewal stickers are purchased. Additional state revenues come from fees charged for drivers licenses, motor vehicles inspections, motor bus and truck registrations, the motor vehicle sales tax and from miscellaneous sources such as interest from deposited funds.

The state share of the half of the vehicle sales tax allocated for highway and transportation purposes is 74 percent for highways and one percent for transportation. As is the case with motor fuel tax revenues, the counties receive 10 percent of these funds and the cities 15 percent.

Another large source of Missouri highway funding is federal funds, which provide money for a variety of highway projects and operations. Federal money is allocated for specific types of work and can only be used for those purposes.

Both state and federal dollars come into the Department at regular intervals during the year. After some of the money



has been used to pay administrative costs, fuel tax refunds and other state agencies such as the Highway Patrol for highway-related services, and the Department of Revenue for tax collection services, it is distributed for use in the construction and maintenance of the state's 32,000-mile state highway system.

Funding for transportation modes other than highways comes from general state revenue and federal funds, while funding for highway functions comes from the user-related sources already mentioned. Both functions are administered by the six-member Highway and Transportation Commission.

And like blood circulating through the body, the highway funding process is a continual one. Just as blood flows where it is needed the most, so highway funds are used where the need is greatest.

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## HIGHWAY FUNDING: HOW OUR REVENUE IS SPENT

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It would be a dream come true to most people if they had over one-half billion dollars to support themselves yearly. For the Missouri Highway and Transportation Department, spending amounts like this to support the highway and transportation system is a reality and one carefully budgeted, researched and allocated. Foreseeing the financial crisis it finds itself in, the Department has been keeping a close eye on where its dollars are going.

Last fiscal year alone (ending June 30, 1980), the Department spent \$586,715,698.62. How can the Department be in a financial crisis with that kind of money to spend? And just where does that money go?

The answer to the first question and part of the second is clear when you consider first that of the total amount spent for fiscal 1980, \$343,264,730.41 went towards construction costs. Consider next that during 1979, construction costs rose a record 42 percent. During that year it cost \$2 million to construct a mile of Interstate highway, \$1.3 million to build a mile of Primary highway and \$760,000 to build a mile of Supplementary highway.

Compare those amounts against 1960, where it cost \$500,000 to build an Interstate mile, \$160,000 for a mile of Primary highway and \$40,000 for a Supplementary mile. While most of the construction dollars went to match federal funds made available to states to aid and improve the highway system and help Missouri stretch its construction dollars, the Department is paying more and getting less due to inflation.

Another area Department money heavily supports is maintenance activities. Here, too, the inflation effects are apparent. During the past fiscal year, \$135,167,889.02 was spent protecting and improving the almost priceless investment Missourians have made in their highway system. Maintenance means the preservation, upkeep and restoration of roadways and related facilities, such as rest areas, in a safe and usable condition. The rapid cost rise of materials used in maintenance such as aggregate, asphalt, paint and portland concrete cement has done its share to inflate maintenance costs.

While construction and maintenance draw the greatest share of the money flowing out of the Department, administration and overhead costs operate out of this money also. Its share of that money is \$36,439,530.34 in fiscal 1980. Salaries and Workmen's Compensation payments are just some of the cost factors in this category. Overhead costs include utilities for operating administration buildings, including maintenance of existing ones and replacement of those no longer economically feasible to maintain.

While administration, maintenance and construction costs account for most of the flow of monies out of the Department, funds going to support other state agencies who provide services to the Department have a place in the total picture. It must be noted, however, the rising amount of money going to these agencies is another factor seriously affecting the budget pinch the Department feels. As the budgets of these agencies go up, the percentage taken out of the state highway fund increases. In the last 10 years, the funds going to other state agencies increased 189 percent, while the revenue from the fuel tax and license fees increased only 76 percent.

In addition, two of these agencies--the State Highway Patrol and the Department of Revenue--have first priority on highway dollars by law for their services rendered. The Patrol polices Missouri's highways, enforcing traffic laws and promoting safety on those highways. The Department pays for operational costs of performing these services. The Patrol received \$40,377,782.86 for this for fiscal year 1980.

The Department of Revenue, on the other hand, received \$15,423,693.03 for acting as the collecting agency for Highway and Transportation revenue sources. This Department collects gas and vehicle sales tax, as well as the receipts from titling, registering and licensing Missouri's vehicles and drivers.

Additional state agencies drew \$7,471,300.65 of Highway and Transportation money. Those agencies include the Department of Agriculture--Weights and Measures, who inspect retail gas pumps for accuracy; the Department of Public Safety, who coordinates law enforcement and public safety activities undertaken by the Highway Patrol; and the Department of Consumer Affairs--Regulation and Licensing, who regulates the intrastate trucking and bus licensing and industry.

Other agencies are the Office of Administration, who perform administrative services such as purchasing and coordinating other management functions for state departments; the State Auditor, who is paid for auditing the Department's accounts; the State Treasurer, who is paid for investing the Department's funds and acting as custodian thereof; the Highway Reciprocity Commission, who enter into reciprocal agreements with other states concerning the highways. The Division of Highway Safety receives Highway and Transportation dollars for administering and supervising a statewide highway safety program.

Finally, the Highway and Transportation Department also provides money back to the taxpayers in the form of motor fuel tax refunds. By law, Missourians who purchase gas for non-highway use such as a farmer would for his

cont.



operations, are entitled to a refund of the tax paid on that gasoline. During fiscal 1980, \$8,570,772.31 was paid back to Missourians for this purpose.

Disbursements such as the Highway and Transportation Department's represent a lot of money to keep track of--especially when it's divvied out to so many different areas and stretched to encompass a whole state's worth of highway operations. But knowing how and where the taxpayer's dollars are spent is priority for the Department. And Missourians can rest assured they will get the most for their dollars, even though inflation has seriously weakened that purchasing power.

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## RESURFACING EXTENDS ROAD LIFE

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One of the many activities of the Missouri Highway and Transportation Department is that of resurfacing. During good weather year round, a motorist may see road crews working near homes, towns, cities, or rural farm areas to improve the surfaces of Missouri's highways.

Why do we resurface our roads?

One of the primary reasons for the resurfacing of the highways is to extend the life of the roadway. By resurfacing a road and correcting its deficiencies, either with Department personnel or through a construction contract, we can expect several more years of life from the surface. If it is not resurfaced, it can continue to worsen beyond repair.

There are no general reasons for all resurfacing projects, an economical and quick method of improving highways. Special consideration must be given to all cases for a variety of reasons. Most resurfacing needs are determined during field reviews performed by Department personnel. However, there are some specific criteria used for the selection of resurfacing projects:

One point taken into consideration when selecting resurfacing projects is that of pavement condition. It is rated from very good to very poor. Certain things an inspector checks in determining the pavement condition are the cracks, the patches, the surface and the joints of the pavement.

Another consideration is that of rideability, meaning the degree to which a road is comforting or discomforting to ride on. The road is reviewed for bumps, pavement settlement, bad joints and potholes.

Another main reason for resurfacing is for the safety of those who drive the highways. The road is checked for its frictional properties (the slickness of the surface), the rutting of the wheel paths which could result in a water build up and cause hydroplaning or ice in the wintertime, the joints which are often confused with the pavement markings and the pavement profile.

Further explanation of the criteria termed "safety" serves as an illustration for resurfacing. For example, a road or an area of a road is chosen for resurfacing because it might be a location where there is a high accident rate. Here resurfacing can perhaps improve the drainage, geometrics or surface frictional properties of the roadway, thus providing greater highway safety.



**Resurfacing insures added motorist safety as it corrects any problems with drainage, geometrics or surface frictional properties of the highway.**

Another example where resurfacing is an aid to highway safety is in striping. Motorists tend to follow the longitudinal joints, the joints that are often confused with lane marking stripes on concrete roads. In order to adequately mark the lanes and guide the motorist the safest way, the Department may resurface a multilane roadway or intersection, covering the joints, before putting down the new lane marking stripes.

Thus among the many criteria and specific situations taken into consideration when determining which roads are added to the Department's resurfacing program, are those providing safety and convenience for the motorist.

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## HIGHWAY LITTER BIG EXPENSE FOR DEPARTMENT

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It costs the Missouri Highway and Transportation Department big bucks to build a highway these days. But what few people realize is that it also costs big bucks to keep them litter-free once they are built.

Department statistics show that over \$1,000,000 was spent on litter pickup during the fiscal year 1979 (July 1, 1978 to June 30, 1979). Breakdowns of that figure show that \$151.13 per mile was spent on litter pickup on rural sections of Interstate, while \$2,129.79 was spent per mile for urban Interstate sections carrying more than 35,000 vehicles per day. Primary highways in rural areas cost \$36.28 per mile to keep litter-free and the cost spirals up to \$761.14 per mile in urban sections carrying over 35,000 vehicles per day.



And these big figures are indicative of the manhours put into litter pickup. During the same period as above, 123,500 manhours were spent in trash collecting at a labor cost of \$855,895.37. Other costs incurred were \$27,125.40 for trash disposal fees, \$111,651.78 for equipment usage and \$10,468.37 for miscellaneous costs such as trash bags.

An additional cost the Department cannot illustrate in dollar amounts is incurred by Department equipment during litter pickup operations. While the Department maintains no records of this expense, the damage sustained by soda cans and glass bottles plus the lost time due to such damage is often substantial.

It's interesting to note that if not picked up, the soda cans and the bottles motorists most often dump will still be around long after most motorists are gone. One aluminum can takes 80 to 100 years to decompose. Glass bottles require 1,000 plus years.

So the next time you roll down your window to throw a soda can out, the Department urges you to reconsider. We'd much rather spend the money it takes to pick up the can on resurfacing a road that will save motorists money in the long run.



Over \$1,000,000 was spent on litter pickup during fiscal 1979 (July 1, 1978 to June 30, 1979). During this same period, labor costs amounted to \$855,895.37.

## DESIGN STANDARDS INSURE ECONOMICAL AND SAFE MISSOURI HIGHWAYS

As an architect designs the new office building or the new grade school down the road from your home, so the highway engineer designs the highways that criss-cross Missouri. The Highway and Transportation Department carefully designs these roadways. Through their efforts they hope to provide the best and safest highways in the most economical manner for the motorists of Missouri.

The Department has adopted guidelines provided by the American Association of State Highway and Transportation Officials (AASHTO) in designing these roads. The design standards include such criteria as the width of the pavement, the grades and the curvature of the roadway and the sight distance required for safe passing. These design standards and many more are constantly reviewed by on-going committees dedicated to continued improvement of the nation's highway system.

There are three main systems of roads in Missouri, classified according to their functional use. They are Interstate, the primary and the supplementary road systems.

The Interstate system is a national system of highways designed to promote interstate commerce and provide for defense access needs. In 1956, Missouri became the first state in the nation to begin construction of the Interstate system. And now the average daily traffic volumes on the various routes of the Interstate system range from 5,000 to an excess of 100,000 vehicles per day. Missouri presently has about 1,100 miles of Interstate highway across the state.

The primary system, established by statute, is composed of roads that extend into each county of the state and provide for both interstate and intrastate travel. The primary roads handle volumes of traffic usually in excess of 1,700 vehicles per day, and there are about 6,500 miles of primary road in the state.

The supplementary system, made up of farm-to-market roads, as they are sometimes called, has been set up to collect traffic and funnel it to the primary system, as well as provide a high level of service to adjoining property. Except in the urban areas, the supplementary roads are generally low volume roads and carry less than 1,700 vehicles per day. Between 1952 and 1962, the Department took an additional 12,000 miles of county roads into the supplementary system, thus providing a state maintained road within two miles of most all rural dwelling units. Today there are about 24,000 miles of supplementary roads throughout Missouri.

Together these road systems make up the 32,000-mile Missouri state highway system, each mile of which has been designed and constructed in order to provide the traveling public with the convenience and safety they deserve. The volume of traffic on a particular kind of road determines the design standards that are followed when constructing and later maintaining the highway.

For example, the Interstate system in Missouri, which contains less than 1 percent of the total road mileage, carries

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approximately 25 percent of all the vehicle miles of travel in the state. The aesthetic appearance and the safety of such a highway are two important factors to the design engineer. Its curvilinear alignment breaks the monotony of a long trip and also provides a scenic view as the traveler moves along the highway. The cost to build an Interstate highway is much greater than the cost to build roads with a lower traffic volume.

Passing is not a problem on Interstate highways because they are designed so there is no opposing traffic. The surface of this type of highway is usually portland cement concrete or asphaltic concrete and the traffic lanes are 12 feet wide. There are as many as eight lanes on some sections of the Interstate -- four traffic lanes moving in one direction and four traffic lanes moving in the other direction. The shoulders are required to be hard surfaced. Shoulders adjacent to the driving lane, or the outside lane, are 10 feet in width while the shoulders adjacent to the passing lane, or the inside lane, are required to be six feet in width.

An Interstate highway is also designed with controlled access. A traveler may enter or exit the Interstate only through an interchange area. Generally interchanges are located at towns and cities along the route, as well as at major road intersections. Rest areas with comfort stations are provided along the Interstate, another distinction of such a system.

The primary system is also designed in terms of the volume of traffic and the terrain. In many cases there are areas of dual primary highway across the state. On the primary system a motorist will find a few more curves and steeper grades than on the Interstate. For a primary road, that is not a dual lane facility, it is required that 40 to 60 percent of the road be designed to provide for passing opportunities.

The surface on a primary highway is either asphaltic concrete which has a black surface color or portland cement concrete with its white surface color. The type of pavement is determined through a pavement analysis which considers the availability of the various materials and the ultimate price of the completed pavement. Primary roads are required to be centerline striped and edge-line striped. Like the Interstate highway the individual lane widths are 12 feet wide. However, the shoulders along a primary highway are only required to be eight to 10 feet wide. These shoulders are normally hard surfaced; however, sometimes gravel is used.

The design of the supplementary system also depends heavily on the terrain and the traffic volume. Flat, rolling and mountainous areas all require different design criteria for a safe road system. Curves can be sharper and grades can be steeper than in any other system. Because the supplementary system has low traffic volumes, traffic can slow for the curves without causing a congestion problem. The design criteria require passing opportunities to be provided on 10 to 25 percent of the system. The reduced passing opportunities do not usually result in congestion problems due to the low traffic volumes.

The pavement on a supplementary road is asphalt -- no longer are these roads gravel or dirt. The traffic lanes are 10 to 12 feet wide with four to eight foot shoulders.

However, regardless of the standards that guide the highway engineer in designing the roads that take us to work, to recreation or to church, the desire is to provide a safe and convenient highway for the people of Missouri and those who visit the Show-Me State.

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## DEPARTMENT COMBATS INFLATION WITH MONEY- SAVING MEASURES

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While high construction costs and declining revenues continue to headline the Missouri Highway and Transportation Department's present financial crisis, money-saving measures initiated at the onset of the dilemma help the Department combat the crippling effects of inflation.

As the Department saw its dollars buying less and less, it became apparent in 1979 that inflation was not going to slow down. So, an intense fuel reduction program was undertaken in the latter part of the year which has yielded a 26 percent reduction in fuel consumption throughout the Department's 10 districts and its Jefferson City headquarters office as of January through June 1980.

The reduction program focuses on five areas. Department mowing operations constitute one focused area that provides a big savings. Here mowing schedules were reduced as much as 50 percent during last summer in some cases, as shoulder, median and slope mowing were curtailed. Grass is now allowed to reach 12 inches in height when previously eight inches was the limit. Highways previously manicured five or six times a season now are cut three time maximum.

A reduction in fuel usage could also, the Department thinks, be realized via a reduction in the maintenance resurfacing of the supplementary roads. Roads were reevaluated. The worst were scheduled for resurfacing, while those in good standing (but previously resurfaced to build up their aggregate base as a preventive measure) would not be resurfaced.

Other areas where a savings could be realized are snow and ice removal where fuel savings come from tightening up with men and equipment (keeping highways clear, but reducing the snow removal on road shoulders), as well as reducing overtime hours by personnel; downsizing the Department's car fleet by buying more fuel-efficient compact cars when the need to replace a vehicle becomes apparent and more efficient use of the existing Department equipment such as motorgraders, mowers and trucks.

Lastly, an area another savings comes from is efficient management and scheduling practices. The Districts and the Equipment and Procurement Division at the Main Office make all efforts to help employees pool rides in Department car with others who are traveling with a similar schedule.

As stated earlier, the fuel reduction program is a success and will remain ongoing. In addition, the Department feel



more savings can be realized through this program and is exploring further ways to cutback.

Besides the fuel reduction program, money has been and continues to be saved through a personnel reduction. A hiring freeze began in May 1980, and was most apparent with only a handful of summer employees hired. This summer 14 employees were hired compared to 607 previously hired in years past. In addition, approximately five lower level jobs, affecting approximately 100 people, were phased out effective September 1, 1980. Job vacancies also have been filled from within. The total employed by the Department has dropped from 6,915 employees in 1970 to approximately 6,200 employees at the present time, attributable to attrition, as well as the already mentioned measures.

To further stretch the highway dollar, the Department will finish reconstruction and relocation projects previously started, but is now gearing our projects to primarily maintain and upgrade the present facility. That will mean a much reduced new construction program since costs are so crippling. Dwindling revenues are providing barely enough to cover maintenance activities.

As might be expected from reduced construction work, the Department also reduced its regular monthly bid lettings in terms of the number of projects and the costs of those projects. This had been done by splitting projects into work stages so as to provide smaller contracts and encourage more competitive biddings. In addition, the Department has made available for the past several years, contractor cost reduction incentives for any work operation.

It is also important to note that two bid lettings have already been cancelled within a year, as anticipated revenue did not match projected work cost of projects scheduled for placement under contract.

Sometimes contracting work and equipment purchases outside of the Department through the bidding process doesn't prove to be the most cost-efficient way. Such is the case with the purchase of Department snowplows. The Department found it could produce their own and save approximately half of the cost of a commercially purchased snowplow. Production takes place in the Jefferson City Headquarters garage with employees doing the actual design and construction.

In the same vein, another cost-efficient operation is being carried out in the Highway Headquarters Garage. Formally scrapped highway signs--often the target of vandalism--have been reclaimed by the Department and reprocessed into new sign blanks for painting. With employees doing the work, \$246,670 worth of sign blanks were reclaimed with an actual savings to the Department of \$358,465 in 1979 alone.

One last money-saving effort results in a boost rather than a reduction. By planning additional highway projects above the normal program, the Department can take advantage of any possible federal windfall that aids states with additional projects ready to go. This paid off last year when the Department received \$125,998,917 for Interstate work from a new federal money pool set up by the Surface Transportation Assistance Act of 1978. Money became available on a first-come, first-served priority to states who

have used up their regular Interstate apportionments, but still had projects ready to go. States must apply the money to a project within 90 days of obligation.

So, by being ready, willing and able should such an occasion as this arise, Missouri received money that greatly stretch highway dollars and enabled the Department to better its Interstate for motorists. This "constant readiness" with additional projects will be maintained should such an occasion rise again.

Getting the most for each dollar and saving some along the way is what it's all about. The financial crisis the Department finds itself in serves to spotlight that objective and provide incentive to initiate and maintain cost efficient measures that may take the "gravy" off the highway menu, but will still provide taxpayers with the "meat" they need.

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## MHTD WORKS TO PRESERVE ENVIRONMENT ALONG HIGHWAYS

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Blending a highway into the environment and developing other ways to protect and preserve that environment are priorities in a Missouri highway designer's mind. It takes a lot of work to make a highway look like one of Mother Nature's elements.

The process for the Missouri Highway and Transportation Department literally begins with "ground work." Just like any farmer, soil samples are taken and analyzed to determine soil fertility and deficiencies. From that, the Department endeavors to use the type vegetation best suited for the area. Then there's land grading, seeding and/or mulching that all enter the process.

Perhaps one of the most important steps during the planning process is preparation of an environmental impact statement. These evaluate any environmental upsets that may be caused from locating a highway at a particular site. Reports are made to various governmental agencies for their review and input.

But the ball has just begun to roll. Next, by means of trial and error, Department research has discovered the best vegetation possible to prevent erosion, as well as provide a pleasing roadside. The best found to accomplish these objectives fall into these categories: grasses, legumes and ground covers. Grass and legumes (plants that provide nitrogen to the soil) are used for their drought resistance, cost, ease of establishment and ability to grow on poor soil; while ground covers are used because they are low-growing plants and require little maintenance.

It should be noted here that the Department relies heavily on legumes, many of which can also be classified as low-growing ground covers. Thus, the Department gets two good deals for the price of one by using these legumes. This becomes clear when pointed out that on practically all roadway locations a mixture of grass and ground cover/legume is sowed. By doing so, the legume provides nitrogen to the soil, which the grass requires to grow and thrive, as well as serve as an attractive ground cover requiring no mowing. Just which type of grass and legume is used in the mixture is

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**Sericea Lespedeza grows thick on an embankment in the Ozark region of Missouri. The Department uses this plant and others to control erosion, as well as provide a pleasing roadside.**

determined by the soil, climate and whether the area is rural or urban.

Tall fescue is the preferred grass used by the Department because of its exceptional adaptability and erosion prevention. It is the most versatile vegetation the Department plants and is adaptable anywhere in the state.

Other grasses sowed by the Department include Bermuda grass, Smooth Brome grass, Kentucky Bluegrass, Red top, Timothy, Reed Canary Grass and Orchard grass.

A popular ground cover used by the Department is Crown Vetch. The vining, lavender-flowered plant is better adapted to the northern two-thirds of the state. It chokes out weeds, making it very adaptable to steep slopes otherwise requiring mowing.

Meanwhile, Southern Missouri is accented with Sericea Lespedeza, another popular erosion control plant.

Other legumes used by the Department include Alsike, Red and White clovers, Hairy Vetch and Birdsfoot Trefoil.

But ground covers and grasses aren't the only plantings gracing our highways. Tree and shrubbery landscaping made possible through highway beautification funds round out the picture.

Finally, matching a highway to its environment also means eradication of noxious weeds such as Johnson grass and some thistles. This is something the Department monitors continuously and controls diligently.

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### THREE YEAR PLAN INDICATES RESURFACING PROJECT PRIORITIES

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Before spending any funds for highway improvement projects, such as resurfacing, the work must first be included in the Missouri Highway and Transportation Department's "Highway Right of Way and Construction Program." The Program is prepared annually to provide an orderly schedule for improvements while matching the funds available to carry out such projects. The Highway Program includes projects for the current fiscal year, a second year or "standby" listing of projects and projects for design. The Program generally covers a time frame of approximately seven years.

However, because of the difficulty in determining pavement deterioration in advance of the actual need, resurfacing projects are only scheduled on a three-year time frame. This three-year resurfacing program is also reviewed and revised annually to insure proper jobs are selected for resurfacing.

But what makes one road worse than another or one pothole worse than another? How are these resurfacing projects selected for the Program? With a limited amount



of revenue that can be spent on maintenance resurfacing, how is that money allotted for the various needs?

The Department's maintenance personnel take care of resurfacing small sections of roads that need spot improvements, such as filling potholes. Often, in response to inquiries from the public, the Department can improve the comfort and rideability of a road with such spot resurfacing improvements. Once there is no longer an adequate riding surface and routine maintenance is no longer practical or feasible, resurfacing becomes a project for the Program and the work is done by outside contractors.

The projects are first selected for the Program by District personnel in each of the Department's 10 Districts. They review roads or sections of roads using service rating data furnished by the headquarters office in Jefferson City to make their appraisal on the pavements in their particular District. The service rating data includes the age of the pavement, the estimated remaining surface life, the pavement condition and the frictional properties. Often their first-hand knowledge about a road helps to determine the road's needs. The project is then introduced by the District engineer, in charge of each District, during the annual review of the Program.

For resurfacing on the Interstate system, the Department uses, in addition to the service rating data, a pavement appraisal panel consisting of persons from the headquarters office. This four-member panel drives each mile of Interstate pavement approximately once every two years and rates each section in terms of rideability, condition, cracking, joint deterioration and other such areas. During the inspection the panel emphasizes rideability, comfort and the visual appearance of the road's surface.

All of the Interstate mileage is then assembled in a priority listing based on this inspection rating. This information is used by the Districts and headquarters personnel in reviewing resurfacing project selection for the entire state.

The Materials and Research Division at the headquarters office then reviews all resurfacing projects before any are placed on the Program. This is done to insure consistency between the Districts throughout the state.

Finally, the resurfacing project information is compiled and presented to the Highway and Transportation Commission for its approval.

Thus these needs become projects on the Program. As revenue is available they are completed - revenue which comes mainly from the state's seven-cent-per-gallon motor fuel tax, vehicle license fees and one-half of the vehicle sales tax or from federal aid matching funds. Revenue for resurfacing on the Interstate system comes from the Federal Interstate Resurfacing Fund which is available to the Department as a 75 percent (federal): 25 percent (Departmental) matching ratio fund.

So with the 32,000 miles of state maintained highways across Missouri, the job of selecting resurfacing projects for the Program tends to be a big one. It requires a great deal

of revenue in order to maintain the roads that have already been built, but hopefully with resurfacing, the Department can add a few more years of life to a road that would cost millions of dollars to replace.

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## BRIDGE INSPECTIONS PROTECT STRUCTURES AND MOTORISTS

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Of the thousands of motorists who cross Missouri highway bridges each day few give any serious consideration to the possibility of their automobiles falling through the structures.

And actually, there's no need for them to worry; it's not likely to happen.

In Missouri, the annual inspection of bridges is one of the fundamental activities long used by the Highway and Transportation Department to insure safety and to protect the service life of structures. Additionally, if there is overstressing of a structure by vehicles carrying loads the bridge was not designed, checks on traffic and axle loadings help point up the likelihood of any impending trouble.

The Department is responsible for approximately 10,000 bridges on the designated state highway system.

Bridge lengths vary from 20 feet to about one mile. Structure inspections are made of each bridge annually under the supervision of licensed professional highway engineers who are familiar with both the design and construction of the spans. Seriously weakened structures such as those damaged in traffic accidents are promptly repaired.

Other repairs involving general bridge deterioration are regularly scheduled work items. Structures are examined for concealed rust and corrosion and a need for painting. A general inspection is made of the individual bridge parts and the various joints. Rust is removed before repainting; loose rivets are replaced; damaged parts are repaired; and other observed defects are corrected.

Although the possibility exists, the collapse of critical truss members from collision damage does not usually lead to collapse of the total truss span on a bridge. In such cases, repairs can frequently be made even while traffic continues on the structures. Joints are checked for loose rivets, stressed parts are examined for cracks and the damaged parts are replaced or straightened and retained in place.

Prolonged stress, however, is a different matter. The failure of a steel member from repeated overloads could be compared to the bending of a length of wire in order to break it. The first time the wire is bent, it does not bend easily but after repeated bending, it gets weaker and weaker and finally breaks.

To combat this problem, sufficiency reports are compiled and maintained on all bridges in the state by the Department's Bridge Division. Bridges found to be weakened by age and heavy use are posted by the Department for maximum safe loads.

Any trouble, if it comes, is generally the result of drivers ignoring the posted load limits on weaker bridges. Department

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officials in the past have reported instances of truck drivers, for example, crossing a span with a 10,000 pound posted limit in a tractor trailer unit weighing in excess of 73,280 pounds.

But officials point out that there is little danger of collapse if postings for maximum safe loads are observed.

Sufficiency ratings are updated constantly. The condition of the structures and the amount of use by the traveling public generally determine which bridges should be given the highest priority for eventual improvement. But when actual improvements are made to the bridges so listed it is determined by the availability of the funds necessary to do the work.

With capital outlays in the hundreds of thousands and even millions of dollars for each new bridge built, the Department is forced to repair many bridges that it cannot afford to replace and to fall back on the system of posting load limits.

Last year the cost for the replacement of seven new bridges replacing existing structures, and the rehabilitation and maintenance of approximately 350 existing bridges was \$18,413,600.00. By contrast, two contracts for the superstructure of the U.S. Route 67 Missouri River bridge at St. Charles came to \$18,249,493.

Obviously, the replacement of outdated bridges will be slow because of the availability of funding. But in the meantime, the Department will continue to take precautionary measures for the protection of all structures on the state highway system in Missouri and will continue to periodically evaluate the bridge maintenance and inspection programs.

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## FEDERAL AID PROGRAM EXPANDS DEPARTMENT PROGRAM SCOPE

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Building highways has always been an expensive undertaking, but one extremely necessary to the social and economic development of the more than four and a half million people who call the State of Missouri home.

For the Missouri Highway and Transportation Department to attempt to build and maintain its more than 32,000-mile highway system on its own would take several lifetimes, as well as many billions of dollars. Fortunately, a method for helping the states construct highways was developed 64 years ago and has been an integral part of state highway construction ever since.

The method was a federal-state partnership known as the federal aid program. By working with it, Missouri has been able to greatly expand the scope of both its highway and transportation programs.

The Missouri highway system depends heavily on federal funds to keep it going. In a typical year, federal funding accounts for 35 percent to 40 percent of the Highway and Transportation Department's \$500 million plus budget.

Federal funds do play an important part in the Missouri highway program, but before one thinks federal funds can be used for anything under the sun, one had better think again.

Federal funds coming into the state for highway programs fall into one of more than 21 categories, each with

its own particular use and percentage of federal participation. The degree of federal participation runs the gamut from 100 percent down to 75 percent, with the matching ratio depending on the type of program.

For example, federal funds used on construction of the Interstate highway system are available on a 90 percent federal, 10 percent state ratio, while funds for use on the secondary or "farm to market" roads are available on a 75 percent federal, 25 percent state ratio.

Sound complicated? It is, but federal funding is a key element in highway and transportation funding, and knowing how to use it the right way is one of the strong points of the Highway and Transportation Department.

It should be realized, however, that receiving federal aid is not all fun and games. There are reams of paperwork to go through and a myriad of rules and regulations must be adhered to in order to use federal money on highway improvements.

Department staff work closely with the Missouri office of the Federal Highway Administration to make maximum use of the funds available and to make sure projects meet federal guidelines.

The bulk of federal highway funds fall into two major categories, those which include highway construction and those which can generally be classified as safety projects. The Department is also the agency through which federal highway funds are passed to Missouri's cities and counties for such programs as the Federal Aid Urban or FAU program.

The major sections in the construction category are the Interstate highway system, resurfacing of the Interstate system, primary highway construction and secondary highway construction. The major sections in the safety fund category are bridge replacement and elimination of roadside hazards and obstacles, such as sharp curves and dangerous intersections.

Several different formulas are used by the Federal Highway Administration to determine how much federal money is available to Missouri in each funding category. After designing highway projects around specific guidelines and design criteria, Missouri secures agreements with the Federal Highway Administration for it to participate in the projects.

The Highway and Transportation Department then obligates state funds for the projects and is reimbursed by the Federal Highway Administration. The finished highways belong to the state and its citizens.

An additional aspect of limited federal funding can come into play once a state has obligated all its federal money, and this category is called discretionary funding because the funds are allocated at the discretion of the secretary of the Department of Transportation.

Missouri has been fortunate in recent years to qualify for discretionary funding for its Interstate system as well as for work on certain bridges. But discretionary funding cannot always be counted on, and it may be discontinued at any time.

The highway program is not the only departmental program which benefits from the use of federal funds,



however. They play a key part in the development of aviation, rail and transit functions as well.

Federal funds available for helping Missouri develop the airports in its cities and towns come from the Federal Aviation Administration through the Airport Development and Assistance Program. These funds are used for airport improvements such as improving runways and for actual airport operations.

Additional federal aviation funds are available to the Department through the Ozark Regional Commission which allocates funds for industrial and transportation development within a five-state area, including Missouri.

Federal railroad funds come from the U.S. Department of Transportation through the Federal Railroad Administration. Funds fall into two basic categories—the Railroad Revitalization and Regulatory Reform Act of 1976 and the Local Rail Service Assistance Act of 1978.

Both acts provide federal funds on a 80 percent federal, 20 percent state matching ratio. The funds are used to help expand passenger service, help rail lines rehabilitate tracks and help communities keep rail service that otherwise would have been lost through abandonment of rail facilities.

Transit operations are helped by federal funds from the Federal Highway Administration and the Urban Mass Transit Administration. Funds are provided to help communities begin bus service or to help defray operating losses incurred by existing transit systems.

Missouri's waterways operations are not directly affected by federal funds, but the Department does help local port authorities obtain them.

So, in the final analysis, the development of Missouri's highway and transportation programs is a combination of both federal and state efforts for the benefit of all citizens. The Department intends to continue making the best use of the federal funds available to it.

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## **RIGHT-OF-WAY AND CONSTRUCTION PROGRAM OUTLINES YEARLY HIGHWAY PRIORITY PROJECTS**

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If you were given over 32,000 miles of highway to maintain and improve, what's the first thing you'd do? If you're like the Missouri Highway and Transportation Department, you'd research and plan an orderly progression of what would be maintained and what would be improved based on the most critical needs of the system, while matching any federal money available to carry out such projects. And you'd call this annual schedule of programmed improvements the "Highway Right-of-Way and Construction Program."

What you might not realize about this yearly task is the tremendous amount of foresight and work involved in putting this Program together. Determining the needs of a state full of highways is the first step in compiling a Program. However, this calls for a continuous monitoring of the most critical problems and their relation to each other long before the Program is decided.

Just how does the Department determine these most critical problems on our highway system? Engineers depend on several different sources to provide them with this information. Most important of these sources are service ratings. Performed and maintained through the year by Department personnel, service ratings indicate road deficiencies.

Engineers concern themselves with three areas when performing service ratings. First, engineers look at the general structural adequacy of the roadway considered. How old is the pavement? What is the estimated remaining surface life of the road? Next, they look at the roadway's service-operational conditions. Is there much traffic congestion, or is traffic flowing smoothly and safely? Are there enough traffic lanes to serve the amount of vehicles that use them? Last, but not least, safety is a prime concern when rating the roadway. Does the intersection need traffic signals to direct traffic and avoid collisions? Do accident rating records maintained by the Department indicate this area as a high accident location?

Answers to these questions and others are noted and deficiencies are rated. Those sections of the system receiving a low service rating indicate more deficiencies than those receiving a high rating.

Along the same lines, annual bridge inspections serve as an additional source of determining needs. As in service ratings, problems are marked. The most deficient structures are indicated.

Together, service ratings and bridge inspections receive ultimate consideration once a year when the Department is ready to compile its Program. At this time, the most urgent of all deficiencies will be pinpointed for the coming year's schedule of improvements.

While the first step in compiling the Program is the performance of service ratings and bridge inspections, the second step calls for providing this information to the Department's 10 Districts. The Districts are also given a tabulation of funds available which is established by Headquarters Office projections. From this material, the District uses its own firsthand knowledge of its own critical needs and make recommendations for additions to the Program to Department Headquarters in Jefferson City.

It is here in the District where citizens interested in highway affairs can make their project preferences known. For example, the various transportation planning agencies of metropolitan areas with populations of 50,000 or more are requested to submit a list of their needed projects.

Once the Districts make their recommendations, the Headquarters Office coordinates them into a state-wide program. Now the District and citizen wishes will be weighed in perspective to important overall needs of the state. Personnel look at such things as commercial development or environmental impacts happening on or near highways that would have significant impact on those highways. This might mean a major factory locating where traffic volume and capacity problems could result. These needs must be anticipated and planned for.

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One other factor will influence the final choice of priority projects-available funds. The Districts have already used this as a guideline when choosing their needs, but the final combination of project costs balanced to funds available rests at the Headquarters. There is much communication and "give and take" between Headquarters and District before Headquarters arrive at a satisfactory combination that is beneficial to the overall system and individual District needs.

Finally, when a tentative Program is composed, it will represent three sections of improvements. The first section deals specifically with priority projects for which an anticipated contract will be let or right-of-way obligated before the end of the Program's current fiscal year. The second section contains a listing of standby projects which may be substituted for a project or programmed into the first section, should a project there become delayed or in the event additional Federal money becomes available. Finally, the third section contains projects approved for plans development.

Before it can become official, the Program goes through three extensive reviews. First, it is reviewed by all the various Headquarters Divisions involved in a project from its conception through planning and design stage, but excludes construction. Once approval is gained here, the tentative

Program goes through another review with the Chief Engineer. This review also includes his staff from all engineering divisions. Recommendations and revisions may occur at this time. A final review is made by the Highway and Transportation Commission. When their consent is obtained, the Program is approved for that year.

However, the Commission seal of approval does not mean the Program is closed to the addition or revision of projects. The business of maintaining and improving highway is ever-changing. It demands a Program with built-in flexibility allowing for emergency situations as they develop. For instance, should structural damage to a bridge or highway occur that would endanger motorists' lives, repair of that facility would take precedence over scheduled projects of a less critical nature. When the addition or special emergency projects or projects eliminating unexpected capacity problems become necessary, special Commission consideration and approval are also necessary.

As you can see, the job of planning an orderly schedule of highway improvements is not a random process. Much thought and time by highway-minded people the state over goes into the development of a Highway Right-of-Way and Construction Program that deals with the most critical needs of Missouri's highway system and accordingly, Missouri's motorists.





## divisions



## ACCOUNTING

The accounting and expenditure control for the Department is the responsibility of the Accounting Division. All the Department's records of financial transactions are processed and recorded by this Division.

Based on anticipated revenues and disbursements, the Division prepared legislative budget requests as well as annual internal budgets.

The Division reviewed all payment documents for accuracy, priority of payment and to determine if funds were available prior to recording and certification for payment.

The Division processed 157,807 checks during 1980, which represented disbursements of \$468,520,809.59. Disbursements through gas tax refunds and other state departments from highway funds equaled \$76,301,451.34. Total disbursements for 1980 equaled \$544,822,260.93.

Worker's Compensation benefits and medical care payments are made by the Department's insurance carrier; however, these payments are routed through the Accounting Division and recorded to insure absolute accuracy of fiscal records. There were 695 Worker's Compensation cases processed this year.

The Division has the responsibility for administering the regulations and policies of the Highway Employees' and Highway Patrol Medical and Life Insurance Plan. As of December 31, 1980, there were 8,912 health insurance plans and 7,888 life insurance plans in force. For the period from January 1, 1980, through December 31, 1980, there were 7,492 health claims with \$6,405,376.53 paid out in benefits and 27 life claims with \$115,543.55 in benefits paid to survivors.



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## RIGHT-OF-WAY

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During 1980, the cost of right-of-way acquired for highway construction totaled \$9,000,145. The Division acquired 541 parcels, of which 468 were by negotiated settlement (or 86 percent) and 78 were by condemnation (or 14 percent).

Payments totaling \$878,664.94 were made in 1980 under the Relocation Assistance and Payment Program to assist displaced families, business and farm operations in relocating. During the year, 300 relocation claims were processed and paid.

Right-of-Way also obtained appraisals for 575 parcels. Two separate appraisals were prepared for 18 percent of the parcels involved, making a total of 678 appraisals produced. An average of 50 parcels were appraised each month, which required an average production of 59 separate appraisals per month.

Receipts from sale of improvements located on right-of-way acquired for highway construction and from the sale of excess property totaled \$628,044.68.

Rental of advance acquisitions and excess property resulted in an income of \$151,399.05.

The Division is actively engaged in implementing the Highway Beautification Act, which relates to the removal of nonconforming outdoor advertising signs and salvage yards.

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## LEGAL

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During 1980, condemnation proceedings acquired 76 parcels of right-of-way needed for highway improvement projects. A total of 221 condemnation cases were disposed of at trial court level, and eight appellate court decisions were rendered in cases involving the Commission. The majority of those cases involved condemnation proceedings. Final judgments in

condemnation proceedings recovered \$703,110.27.

Ten actions were filed in circuit court for collection of damages to Commission-owned property and 12 such cases disposed of. A total of \$377,845.51 was collected for damage to Commission-owned property involving 1,325 separate claims. Litigation was necessary to collect amounts in some of these claims.

Legal conducted 68 administrative hearings, 65 of which involved hearings relating to enforcement of laws pertaining to outdoor advertising structures. The remainder of these hearings related to relocation assistance payments and the relocation and alteration of utility facilities necessary to accommodate highway construction. In reference to administrative hearings, fifteen cases were filed in circuit court for review of orders rendered by the Commission, and suits were instituted on behalf of the Commission in 11 cases to compel the removal of illegal advertising signs.

Twenty suits were instituted in circuit court for law enforcement of junkyard maintenance, and 9 such cases were disposed of. Sixty-eight applications were filed with the Public Service Commission for approval of railroad-highway crossings and protective devices at such crossings.

Sixty-nine actions were commenced against the Commission for such matters as tort claims, inverse condemnation and contractors' claims. However, most of the actions commenced against the Commission were tort actions.

This office also collected \$60,671.26 on miscellaneous matters, most of which was for the reimbursement for alteration of utility facilities in connection with highway improvements.

In addition to the litigation and administrative hearings handled by this office, numerous contracts to which the Commission was a party were prepared and approved.

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## MATERIALS AND RESEARCH

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Materials and Research carried out its responsibility of inspection and approval of materials used in the maintenance and construction of the highway system. The Division also conducted highway research into materials, designs and procedures to improve performance or reduce costs, yet maintain the necessary high quality of materials for this work.

District personnel conducted field inspections of materials used for maintenance and construction. Examples of approximate material quantities inspected during 1980 are: 5.4 million tons of crushed stone, sand, gravel and other aggregates, 60 million gallons of bituminous materials (such as asphalt cement and emulsified asphalt), 14 thousand tons of reinforcing steel for concrete and 73 thousand linear feet of drainage pipe.

Additional responsibilities included the design of all bituminous and concrete mixtures used throughout Missouri for state highway construction. The Division also provided technical assistance and advice to the 10 Districts regarding materials inspected.

All materials requiring specialized testing not performable in the field were shipped to the Central Laboratory in Jefferson City for testing. To insure uniform testing procedures throughout the state, many of the field tests were also performed in the Central Laboratory.

The Central Laboratory is a nationally recognized and approved laboratory for testing of highway materials. For the second year in a row, it received a perfect score when inspected by the American Association of State Highway and Transportation Officials.

Research performed by the Division included proposed methods to accelerate testing and improve efficiency in materials inspection in research. The items studied in 1980 range from investigation of joints in portland cement concrete pavement



to the investigation of cavities under the surface by the use of photography and sonar. A total of 7 major research projects were underway during 1980. Many minor projects, such as condition surveys on individual bridges and investigation of proposed new highway materials were also completed.

The Division also tested and made recommendations regarding materials on which highways and bridges must be built. District personnel handled and planned the local work necessary. However, the drilling equipment used to obtain subsurface information was headquartered in Jefferson City and dispatched wherever needed.

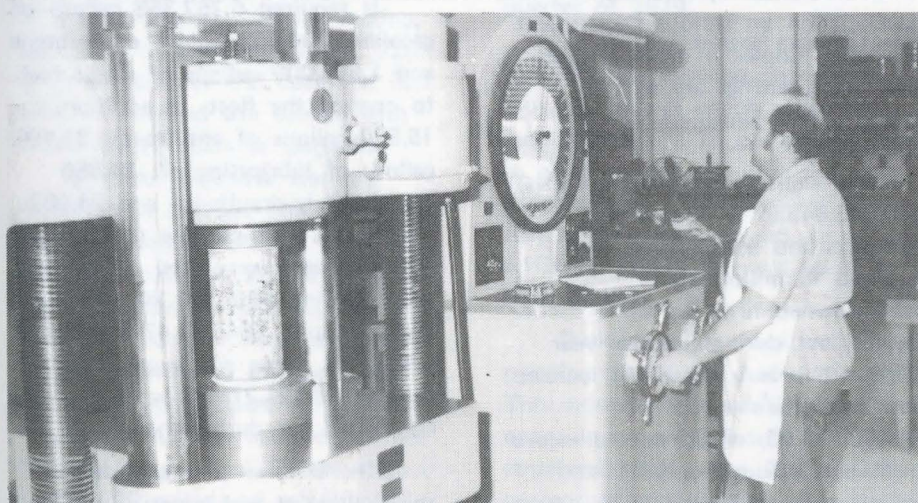
Specialized personnel assigned to the Jefferson City Division office analyzed materials whenever and wherever needed on a statewide

basis. They also assisted District personnel with individual soil and geological problems. These personnel make recommendations regarding fills to be used on highways, steepness of side slopes and any other items concerning the soils or materials to be encountered on a proposed roadway. They also investigate slides which occur on completed sections of roadway and recommend various solutions. Major projects performed during the year included drilling approximately 1,500 cores from completed concrete pavements and investigating 45 proposed bridge locations.

The total of 24,160 samples were tested in the Laboratory during 1980, including those of an experimental or investigative nature.

The quantities of various materials inspected, tested and approved for 1980 included:

Aggregates	5,370,018 Tons
Cement	307,349 Tons
Reinforcing Steel	13,905 Tons
Culvert Pipe	
Corrugated Metal	23,313 Linear Feet
Reinforced Concrete	49,705 Linear Feet
Joints--Bituminous, Fiber & Metal	230,514 Linear Feet
Joints--Rubber	9,037 Square Feet
Guardrail	188,412 Linear Feet
Post--Metal	65,151 Posts
Lumber and Square Posts	85,269 Board Feet
Piling and Round Posts	8,650 Linear Feet
Bituminous Material	
Cutback	13,919,382 Gallons
Penetration	17,916,808 Gallons
Emulsified	27,932,455 Gallons
Paints	601,832 Gallons



## PERSONNEL

The Personnel Division provided assistance to the Divisions and Districts during 1980 regarding personnel management matters such as employment, affirmative action, employee development and training, employee relations, wage and salary administration, retirement and the interpretation and uniform administration of personnel policies.

During 1980, representatives conducted a campus recruiting program for the graduating classes of accredited civil engineering colleges in Missouri to secure a limited number of civil engineers for the Department.

The Department is an Equal Opportunity Employer. Affirmative Action Programs remain a high priority. Recruiting efforts were conducted to locate qualified minorities, including females and other protected group applicants for Department job opportunities.

The Division supplemented employee training by structuring a seminar held for designated supervisory levels tailored to the policies and needs of the Department. Instructed by University of Missouri faculty, the seminar included special emphasis on the supervisor's role in administering a successful affirmative action program.

The Division coordinated, in conjunction with the University of Missouri, a "Co-Operative Civil Engineer Training Program." The program is designed to provide promising civil engineering students with on-job technical experience by alternating work with University of Missouri attendance. Students graduating from this program have acquired actual experience in most phases of highway and transportation engineering, and became productive with a minimum amount of orientation and training. The program is also an aid in the Department's Affirmative Action Program.

cont.



To facilitate good Department relations with its employees, all personnel transactions are reviewed by this Division to attain equitable and uniform salary administration and policy application. Job evaluations were conducted when needed to maintain accurate job specifications and internal salary equity.

Every effort to maintain an adequate salary structure and employee benefits program was made. The Division conducted compensation surveys in order to formulate recommendations. A review of prior wage service credit rewarded employees toward retirement to determine equity under the present retirement statutes continued.

Further data processing applications were made to the centralized personnel records to permit more rapid retrieval of basic personnel data required for State, Federal and Management Information reports. The Unemployment Insurance Program for terminated Department employees also continued.

Numerous special reports and studies were compiled by the Division as needed by the Department to analyze effective utilization of employees and monitor progress of various programs.

The Department had 6,196 salaried employees on December 31, 1980, compared to 6,519 on December 31, 1979. Due to budgetary restraints, only a few temporary employees were employed during the summer for seasonal work as opposed to previous years. Temporary employees were employed for emergency work such as road maintenance during snow storms only as necessary. The Department has reduced the number of salaried employees from 6,941 in 1970, primarily through attrition, to correspond with declining revenue.

During 1980, 104 employees were processed for retirement from the Department, of which eight were between the ages 55-60 with 15 or more years' service; 59 were between

ages 60-65 with 15 or more years' service; 17 were between ages 65-70 and 20 qualified for disability benefits. Early retirement prior to age 65 continues to be the trend. The Highway Employees' and Highway Patrol Retirement System is currently paying benefits to 1,792 Department retirees or eligible survivors.

The Department monitors pension system trends to evaluate what improvements in retirement system benefits are feasible, while maintaining actuarial soundness.

As part of its overall Affirmative Action Program, the Department is committed, under Title VI, to encourage, develop and implement programs to assure that minority and female-owned business enterprises are afforded every opportunity to participate in state and federally-assisted programs, as contractors, consultants and suppliers. A minority or female-owned business enterprise is a business of which at least 50 percent is owned by minority or female group members.

Toward this end, the Department has made an effort to reduce the size of selected contracts to provide more entry opportunities for smaller, less experienced minority and female-owned firms. The Department has also allowed joint ventures in order to provide more entry opportunities.

The Department works with and through minority and female-owned agencies and contractor associations in an effort to increase their participation on various Department projects. Copies of news releases advertising lettings are sent to minority and female-owned contractors.

Through its affirmative efforts, \$10,015,648.82 in federal-aid contracts and subcontracts were awarded to minority and female-owned firms by the Department during calendar year 1980. This is a significant increase over last year's awards of \$4,450,214.93, which were a record high, but included only minority-owned firms.

The Department will continue its efforts to further minority and female-owned business participation in state and federally assisted programs.

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## EQUIPMENT AND PROCUREMENT

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During 1980, this Division was responsible for procuring and maintaining a fleet equipment that would efficiently and effectively permit the Department to carry out its functions. During the year, 6,071 rental units consisting of passenger cars, trucks, carryalls, tractors, mowers, motorgraders and various miscellaneous units were maintained.

The Division-developed method for collecting equipment downtime information was expanded to all Districts. The information collected should be useful in determining mechanic quotas and assignments as well as optimum equipment replacement schedules.

Field work for collecting data on synthetic oil use was completed in 1980. The data is now being evaluated and should provide a basis for determining if oil use is economically feasible.

The Division continued monitoring fuel usage of equipment. Results show a reduction during 1980 from 1979 of 18.6 percent in gasoline consumption and 27.6 percent in diesel consumption.

It required 6,757,358 gallons of gasoline, 204,852 gallons of kerosene and 1,550,009 gallons of diesel fuel to operate the fleet. In addition, 15,570 gallons of anti-freeze, 91,496 gallons of lubricating oil, 34,856 gallons of hydraulic oil and 94,982 pounds of multi-purpose gear oil and lithium grease were used. Tires and tubes costing \$967,681.24, tire chains costing \$64,092.47 and shop equipment, parts and supplies totaling \$3,121,275.86 were contracted for during the year.

The Division also provided all tools, supplies and materials required



in the operation of the Department. The quantities of the various materials purchased for use in highway maintenance are included in the chart below.

The Headquarters Sign Shop produced a total of 78,105 signs and markers of various shapes and sizes amounting to \$740,002.87 during the year.

with linseed oil and mineral spirits to protect them against chloride damage.

Efforts to control Johnsongrass continued, especially in counties adopting the Johnsongrass laws. In 1980, approximately 5,000 acres were sprayed by contract and approximately 2,500 acres were sprayed by maintenance forces. In addition to this program, spot areas were chemically treated to control other weeds, thistle and brush.

The Division also continued to submit a quarterly energy consumption report to the Missouri Department of Natural Resources. These reports indicate that for the first three quarters of 1980, 23 percent less fuel was used than in the same period in 1978, and 25 percent less than was used in the first three quarters of 1979. These reports cover gasoline and diesel fuel used in the Department's cars, trucks and other equipment along with heating, air conditioning and lighting for all Department buildings.

Due to the reduction of maintenance funds, the Division did not build any new maintenance buildings in 1980. We also discontinued the program of partitioning and insulating existing maintenance buildings.

The winter of 1979-80 was fairly mild when compared to the three previous winters. During the season our snow and ice control costs were \$13,898,691. This was a 38 percent reduction in costs for the 1978-79 winter.

There were 1,220 billboards removed by property owners and 161 removed by state forces under the Outdoor Advertising Laws and Regulations.

Activities funded from 402 Program Funds under the 3+ Standards of the Missouri Highway Safety Program as coordinated by the Department are as follows:

\*The Traffic Engineering Assistance Program--This is a program established to aid political subdivisions with traffic engineering problems where a comprehensive view is required and where the

cont.

Various Types of Asphalt	39,651,485 gallons
Gravel	857,200 cubic yards
Stone and Chat	860,836 tons
Paint	468,987 gallons
Reflectorizing Spheres	2,189,700 pounds
Sodium Chloride (Winter 1979-80)	87,469 tons
Calcium Chloride (Winter 1979-80)	6,336 tons
Treated Wood Sign Posts	23,220 each
Steel Sign Posts	28,750 each
Agricultural Seed	46,775 pounds
Mower Parts	\$338,515.15

## MAINTENANCE AND TRAFFIC

During 1980, the total mileage of roadways maintained by the Division increased 65 miles to total 33,887 miles. This includes recreational access roads, outer roadways, ramps, service roads and maintenance agreement sections.

One of the major expenditures by the Division was on low type bituminous surfaced routes. In an effort to cut maintenance costs for the last several years, we have been reducing the maintenance surface treatment program. In the 1980 program, the Division completed 2,479 (40 percent) less miles than were completed in the 1979 program. This reduction included eliminating an 800 mile contract leveling course program, a reduction of 1,209 miles of roadway mixing, 168 miles of premix contract, 220 miles of contract seal coat and 301 miles of off-road site mixing with either motorgraders or pugmills.

A major objective was the reduction in cutback asphalt use to conserve energy. During 1980 the price of emulsified asphalt at times was below the cutback asphalt price. This, coupled with more emulsified asphalt available in the southwest and south central part of the state resulted in further reduction of our cutback usage. In 1979 we used 31,030,200 gallons of emulsified

asphalt and 26,782,000 gallons of cutback or 54 percent of the asphalt used was emulsified asphalt. In 1980 27,484,000 gallons of emulsified asphalt and 12,207,000 gallons of cutback, or 69 percent of the asphalt used was emulsified asphalt.

Approximately 18,120,800 less gallons of asphalt were used in 1980 than in 1979. This was due primarily to the reduction in maintenance surface treatment programs.

The Department, in a continuing effort to conserve energy, has been building pool parking areas in and adjacent to the metropolitan areas. In December 1980 there were 3,174 spaces of which 960 of those spaces were built in 1980--an increase of 43 percent. The average daily usage in the last quarter of 1980 was 2,051 cars compared to 1,744 in the last quarter of 1979.

To further reduce expenditures in 1980, the Division changed its mowing policies which reflected approximately a 25 percent reduction in acres mowed. During the year, approximately 285,000 acres of right-of-way were mowed. In addition, \$1,276,950 was spent on litter pickup.

Division paint crews completed painting 90 bridges during the year. This amounted to painting approximately 4,000 tons of structural steel. Also 222 or 3.5 percent of state bridges were treated



subdivision does not have personnel available to carry out the review. These services are performed by consultants retained by the Commission for this purpose. Thirty-one studies were conducted in 26 political subdivisions. The average cost increased \$110 each from 1979 to an average cost of \$2,350 per study.

\*Bridge Engineering Assistance Program--This is a program established to aid political subdivisions in obtaining information on the structural adequacy of bridges under their jurisdiction. These services are performed by two consultants retained by the Commission on a yearly contract and several other consultants retained on a cost-per-bridge basis. These services include, in addition to determining structural adequacy, the inventory of part of the off-system bridges including establishing posted weight limits and priorities for repairs or bridge replacement. Structural adequacy reports and inventories were conducted on approximately 1,700 bridges during the year, costing a total of \$460,225.

The sign reclamation plant continued as one of the major saving accomplishments for our Division during the past year. This plant was placed into operation in September 1977. Sixty-eight percent of the metal signs now provided to the districts are reclaimed signs from our sign reclamation plant. During 1980, we reclaimed 50,300 signs with a total square footage of 206,000. Through the operation of this plant, \$1.11 per square foot for every sign provided the districts was saved. The savings to the state through this operation during the calendar year 1980 amounted to approximately \$230,000.00.

In 1980, due to the financial situation, the Department reviewed the Striping Program and determined cutbacks could be achieved without measurably depriving the traveling public of roadway striping benefits. Due to these striping reductions, 54,300 miles of stripe was placed

compared to 71,900 miles of stripe in 1979. This total included 34,100 miles of centerline and laneline, 12,200 miles of edgeline and 8,000 miles of "No passing Zones." To complete this work, approximately 415,000 gallons of paint and 1,999,000 pounds of reflectorized glass beads were used. The reduction measures resulted in a material savings to the Department during 1980 of \$663,000.00.

In 1979 the Maintenance and Traffic Division started developing a new Maintenance Management System. In 1980 a field inventory of the main physical features which are maintained was taken. The data collected is being stored in the computer for future use. Field crews started reporting units of work accomplished on a daily basis. Data Processing programs are being developed to determine unit cost information. All Districts were assigned various subjects for their development of tentative work performance standards and training programs.

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## BRIDGE

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Responsible for the design of all bridge structures on the state highway system, the Bridge Division completed 36 designs for letting. Thirty-three pertain to major system routes, while three are to be built on supplementary routes.

Total length for all new structures contracted during calendar year 1980 amounted to 12,102 feet at a cost of \$32,031,500. From this, 289 feet, costing \$368,546, were supplementary route designs.

Included in the above statistics are designs for portions of two large structures. A contract was let for the fabrication and erection of the superstructure steel for the new 1,718 foot Route 36 Missouri River Bridge at St. Joseph at a contract price of \$8,301,750, with a 751 foot approach structure at a contract price of \$990,397.

In addition to the above, 11 designs were prepared for the

repairing, widening or extending of 3,551 feet of existing structures by contract costing \$2,424,271.

This Division assisted in completion of inventory and inspection of off-system or county/municipally owned bridges as part of the Federal Highway Administration Bridge Replacement and Rehabilitation Program.

The program of rating all bridges on the state highway system is continuing in this Division. Bridge structures are being rated by computer to determine the safe loading capacity.

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## CONSTRUCTION

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Construction work continued during 1980 on Interstate 170 in the St. Louis area, Interstate 229 in St. Joseph and Interstate 435, 670 and 470 in the Kansas City area. In addition to this construction work, the second bridge over the Missouri River at St. Charles on Interstate 70 was redecked.

Cost for inspection of construction projects was maintained at a low level by upgrading equipment, by additional personnel training and personnel reduction.

Awards were made on 119 construction projects in 1980. This represents 297 miles of road construction. One hundred fifteen projects included Federal-Aid, while four projects were financed entirely by State funds. The money value of the awards, including engineering and non-contractual costs, totaled \$147 million. The breakdown is as follows:

Interstate system--\$67 million  
Primary system--\$65 million  
Supplementary system--\$7 million  
Non-contractual cost--\$8 million  
Total--\$147 million

The Interstate system contracts involved new construction, upgrading existing dual facilities to Interstate standards, rest areas, highway beautification and implementing the latest safety features for highway traffic. Approximately four miles



were completed to Interstate standards this year. There are now under construction approximately 32 miles of Interstate road. Missouri has 1,102 miles of Interstate roads up to Interstate standards.

The Primary and Supplementary system contracts include costs of construction work in rural and urban areas and projects financed either

with Federal-Aid or with 100 percent State funds. They include new construction, bridge replacements, widening and highway beautification projects. Where applicable, the latest safety features were included.

Below is a resume of the projects under construction that have not been completed:

#### ACTIVE PROJECTS AS OF DECEMBER 31, 1980

System	Contr. 1975	Contr. 1976	Contr. 1977	Contr. 1978	Contr. 1979	Contr. 1980	Total
<b>FEDERAL-AID</b>							
Interstate	0	0	0	5	19	22	46
Primary	1	0	2	3	12	35	53
Supplemental	0	0	0	0	2	7	9
Off-System	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>12</u>	<u>12</u>
Sub-Total (FA)	1	0	2	8	33	76	120
<b>100 PERCENT STATE</b>							
Interstate	0	0	0	0	0	0	0
Primary	0	0	0	4	0	2	6
Supplemental	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>1</u>
Sub-Total (St.)	0	0	0	5	0	2	7
<b>GRAND TOTALS</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>13</b>	<b>33</b>	<b>78</b>	<b>127</b>

## PLANNING

During 1980, Planning carried out their basic responsibilities—that of obtaining current data pertinent to the state highway system and maintaining historical records for future use. From this basic data, programs were developed for the continued improvement of transportation within the state.

In cooperation with local officials, the comprehensive transportation planning process was continued in the state's urbanized areas of St. Louis, Kansas City, Springfield, St. Joseph and Columbia. The process included developing and evaluating multimodal short range and long range transportation improvement programs in conjunction with perceived transportation needs.

To provide information regarding vehicle types and traffic volumes using the state highway system, 5,400 vehicle counts and 125 vehicle classification studies were made throughout the state. This information is needed for design, maintenance and priority programming including other related areas. Special origin and destination traffic studies were made at three cities by use of the driver interview method. Also, speed data was obtained by monitoring 54 separate locations throughout the state.

Information required to maintain and update the National Highway Performance Monitoring System Study was prepared by the Division of Planning. Evaluations of condition, safety and capacity were published in the Interstate and Primary System Service Rating. Physical and geometric data for all

roads and bridges on the state system were updated and used to evaluate the needs.

Income and expenditures were projected, and a Highway Right-of-Way and Construction Program was developed, including sufficient projects to use the present and anticipated available state and federal funds for Interstate, Primary and Supplementary System and various other categorized federal-aid programs.

During the year, 28 county general highway maps were prepared and 41 city or urban vicinity maps were either revised or redrawn. Also, 1,250,000 Official Highway Maps were printed for public distribution.

The following table shows the status of the state highway system as of December 31, 1980:

#### STATUS OF THE STATE HIGHWAY SYSTEM AS OF DECEMBER 31, 1980

SYSTEM	ROAD MILES
Interstate	1,105.638
Primary	6,840.615
Supplementary	24,229.880
<b>TOTAL</b>	<b>32,176.133</b>
<b>TYPE</b>	
Oiled Earth	0.000
Granular	4.274
Low Type Bituminous	24,970.549
High Type Bituminous	4,331.929
Concrete	2,869.381
<b>TOTAL</b>	<b>32,176.133</b>

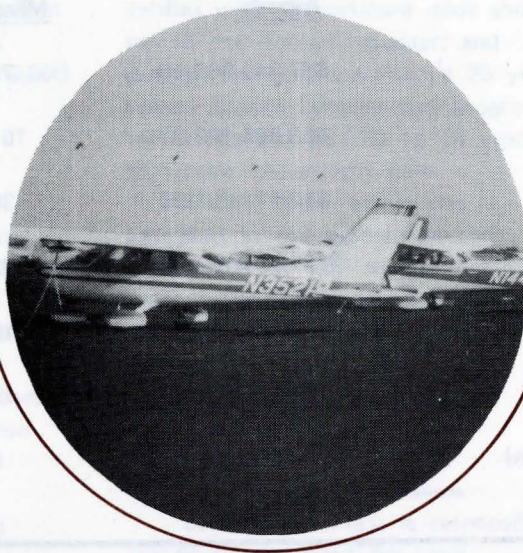
## PUBLIC INFORMATION

Functioning as the Department's spokesman to interested publics and media, the Public Information Division listened and responded to public opinions, inquiries and requests concerning highway and transportation matters throughout 1980.

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# transportation



## TRANSIT

The transit section assists in the planning development and operations of public transit systems in the state. This function is carried out through administration of state and federal programs relating to public transportation with specific programs for the elderly and handicapped.

The Missouri Elderly and Handicapped Transportation Assistance Program provides state financial assistance for nonprofit organizations offering transportation services to the elderly and handicapped at below cost rates. In 1980, \$725,000 state general funds were matched with over \$1,900,000 in federal funds to subsidize essential transportation services. Total monetary assistance generated by this program totaled \$2,625,000.

Transit also administers funds made available by the U. S. Urban Mass Transportation Act of 1964. Under Section 18, money is available for a program that provides planning, capital and operating assistance for public transit systems in non-urbanized Missouri areas. 1980 was the first year of the program with 20 regional transit studies initiated and 10 completed. These studies inventory local transportation services and estimate local needs for the Department.

Another section of the Act provides federal capital and operating assistance to transit systems in urbanized areas (over 50,000 population). The Department administers this program for Columbia, Springfield and St. Joseph. In 1980, the Department made \$1,841,757.79 in federal aid available to the transit systems in the three eligible areas.

Capital assistance to nonprofit organizations giving transportation service to the elderly and handicapped is provided by Section 16(b) (2) of the Act. In 1980, this program provided over \$750,000 federal assistance. This was matched with over \$937,500 local funds for the purchase of 65 vehicles, wheel



chair lifts, ramps and similar equipment for elderly and handicapped transportation.

Ten city transit plans were completed by Transit in 1980. These studies identified specific transit options and services that are the final guide to project implementation. Ten other local areas began the planning process in 1980.

Planning activities in 1980 led to the approval of \$912,282 in federal funds for local capital and operating projects. Federal funds may be used to match local funds for capital purposes on an 80 percent/20 percent local basis. Federal funds also may be used to defray 50 percent of a transit system's operating losses.

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## RAILROADS

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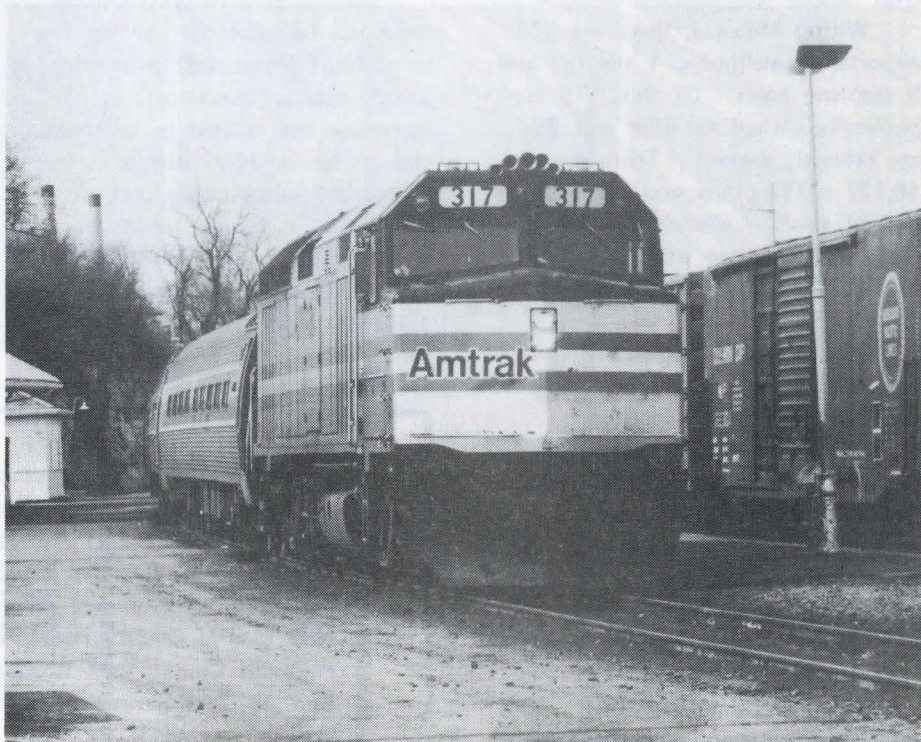
A planning work program and application for planning assistance was submitted to the Federal Railroad Administration in March, 1980 and was approved in May, 1980. This planning grant enabled the Department to prepare the 1980 Annual Update to the State Rail Plan, as well as address various rail matters affecting the state. Funds allocated were \$107,248 federal and \$26,812 state.

Two projects were undertaken in 1980. The first was concerned with rehabilitation of 25 miles of track of the Illinois Central Gulf Railroad, Mexico, Mo.-Fulton, Mo. The state submitted a project application to the Federal Railroad Administration in April 1980 with subsequent approval in July 1980. This project application financed the remaining amount needed to complete the project. Funds allocated were \$546,916 federal, \$6,512 state, \$42,078 local and \$88,140 railroad to total \$683,646.

A second project involved rehabilitation of 58.6 miles of the Missouri-Kansas-Texas Railroad between LaDue, Mo. to the Kansas state line. Project application was



Transit helps administer specific transportation programs aimed for the elderly and handicapped.



Missouri's Amtrak program between St. Louis and Kansas City continued and expanded as two trains now service this area.

submitted September 1980 with approval the same month. Funds allocated were \$1,490,801 federal, \$13,652 state, \$1,402,807 railroad to total \$2,907,260.

Missouri's Amtrak 403(b) program between St. Louis and Kansas City continued and expanded for fiscal year 1980. The "Ann

Rutledge" was in its second year of operation during 1980 on a funding ratio of 65 percent federal funds and 35 percent state funds (\$784,000). The "Missouri Mule" began its first year of operation on a funding ratio of 80 percent federal funds and 20 percent state funds (\$494,000).



## AVIATION

Aviation is mandated by law to promote the advancement of aviation and to offer technical advice to the cities, towns and counties throughout the state.

Aviation provides financial assistance through its Airport Assistance Grant Program. Under this, each city, town or county owning and operating an airport is eligible to receive up to \$25,000 in any one fiscal year and up to \$75,000 in any five fiscal year periods. In addition to this program, the staff is available to any airport sponsor for technical advice relative to planning and/or construction of airport facilities and to coordinate local aviation activities with federal and regional agencies.

Within Missouri, there are 332 airports, 36 heliports, 1 stolport and 5 seaplane bases. Of this, 115 are publically owned facilities and 259 are privately owned. There are 16,127 active pilots and 3,949 active general aviation aircraft within the state. Twenty-three scheduled airlines provide service at 12 Missouri airports.

Grants totaling \$386,516 in airport assistance funds were awarded to 28 public airport sponsors. Included in the projects were one Airport Master Plan and one Area Demand Study. State funds matched \$3,234,941 local and \$3,952,458 federal money to total \$7,573,915 expended on state assisted airport development projects.

An air traffic survey was conducted at 33 airports. Ninety-two airports were inspected under the FAA 5010 program. Also, Aviation presented testimony before the Civil Aeronautics Board regarding essential air service at two airports.

A federal grant was obtained and preliminary work completed to update a section of the Missouri Airport System Plan. Progress was also made on the General Aviation System Study for the St. Louis metropolitan area.



## WATERWAYS

Waterways provides technical assistance to local port authorities throughout Missouri in promoting private capital investment, in increasing the volume of commerce and in the establishment of a free trade zone within their port districts. Every city or county which is situated upon a navigable waterway may form a port authority. By 1980, ten port authorities have been formed along the Missouri and Mississippi Rivers.

In addition to providing technical assistance, Waterways also provides funding to assist the port authorities in developing port sites. During 1980, \$250,000 of grants were made to eight port authorities and Bi-State Development Agency (the managing agency for the Port of Metropolitan St. Louis). The funds were distributed as follows:

These funds are used by the recipient for managerial, engineering, legal, research, promotion, planning and other non-construction related expenses.

Kansas City Port Authority	\$23,944
St. Louis County Port Authority	32,923
St. Louis City Port Authority	29,931
Jefferson County Port Authority	33,019
Southeast Mo. Regional Port Authority	36,648
Mississippi County Port Authority	14,966
New Madrid County Port Authority	21,670
Pemiscot County Port Authority	41,933
Bi-State Development Agency	14,966
	<u>\$250,000</u>









# TRANSPORTATION - MISSISSIPPI

CONSTRUCTION \$295,630,575.31

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MAINTENANCE \$127,115,640.19

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TRANSPORTATION FUNCTION \$5,407,123.93

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ADMINISTRATION \$33,796,844.42

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O.A.S.I. (HIGHWAY) \$6,564,412.00

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GAS TAX REFUNDS \$8,021,421.95

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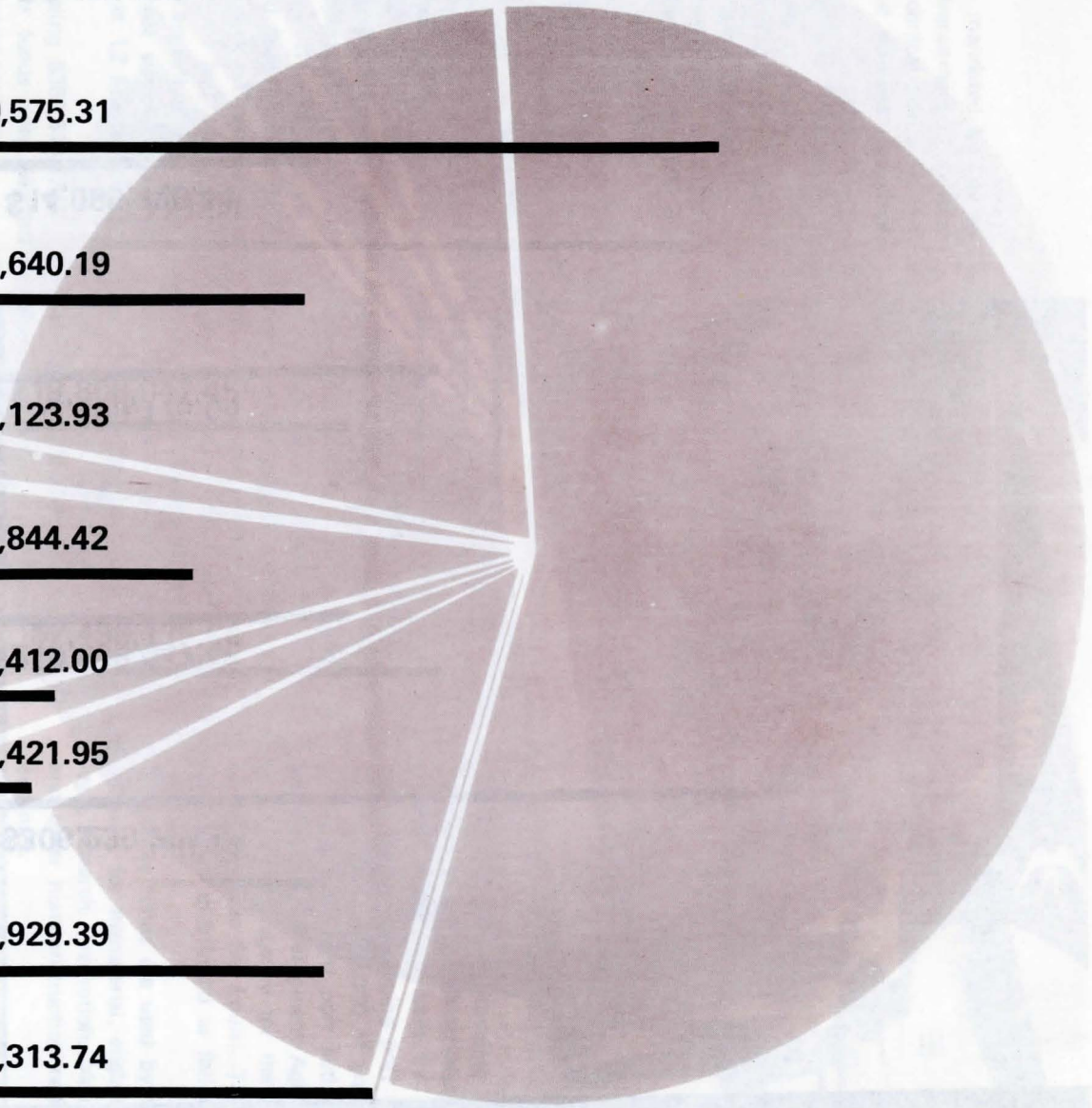
OTHER STATE DEPARTMENTS \$68,279,929.39

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MISSISSIPPI RIVER PARKWAY COMM. \$6,313.74

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TOTAL DISBURSEMENTS \$544,822,260.93





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